JOURNAL *of* EDUCATIONAL RESEARCH

Volume XXXIV OCTOBER, 1940 Number 2

# METHODS OF RESEARCH AND PROBLEM SOLVING IN EDUCATION[1]

CARTER V. GOOD
*University of Cincinnati*

*Editor's note:* The last quarter of a century has seen many extensions and improvements in the evaluation techniques employed in the field of professional education. More and more workers are becoming acquainted with these techniques and employing them in the evaluation of educational activities. Dr. Good presents in the accompanying paper a survey of recent developments in this area.

EDUCATION as an organized discipline and field of instruction is primarily a product of the twentieth century, with the most rapid development coming after the first decade of the present century. These advances of the past thirty years in the content of education are not an accident, but are closely associated with the development of research procedures for problem solving. In fact, there is a reciprocal relationship between the evolution of a body of instructional material and the formulation and refinement of new research techniques. For example, the availability of subject matter content and source materials in such a field as history of education makes possible the training of the investigator, who in turn advances the boundaries of knowledge in his chosen area through use of the historical method, and in some instances contributes refinements of the method itself.

## THE METHODOLOGY OF EDUCATIONAL RESEARCH

The breadth of the field of education and the complexity of its problems have made it desirable to adapt a considerable body of content and a variety of research procedures from such areas as philosophy and logic, mathematics and statistics, sociology and social work, psychology and experimental science,

[1] Prepared for the Section on Education, Eighth American Scientific Congress, Department of State, Washington, May 10–18, 1940.

history, economics, law, and library science. As witnessed by the literature of educational inquiry, such materials and techniques have been arranged in increasingly coherent programs of content and patterns of investigation.

The major problems of methodology in educational research may be grouped under the following headings, although space limitations permit discussion of only the major methods of attack on educational problems together with incidental characterization of the purposes served by certain techniques for collecting data.[2]

I. Methods of attack on educational problems
   1. Formulating the problem and survey of related literature
   2. Historical method
   3. Normative-survey method
   4. Experimental method
   5. Case method
   6. Genetic method
   7. Correlation studies

II. Techniques for collecting data
   1. Testing
   2. Questionnaire
   3. Interview
   4. Observation and recording
   5. Appraisal instruments: rating scales, score cards, check lists

III. Procedures for analyzing and interpreting data
   1. Table making
   2. Statistical concepts
   3. Interpretation and generalization

---

[2] Extensive recent treatments of research studies and investigational methods are available in the following sources:

Frank N. Freeman and Others, *The Scientific Movement in Education*. Thirty-seventh Yearbook of the National Society for the Study of Education, Part II. Bloomington, Illinois: Public School Publishing Co., 1938. Pp. xii + 495.

Carter V. Good, A. S. Barr, and Douglas E. Scates, *The Methodology of Educational Research*. New York: D. Appleton–Century Co., 1936, 1938. Pp. xxii + 890.

Carter V. Good and Others, "Methods of Research in Education," *Review of Educational Research*, IX (December, 1939), 449–672.

*The Implications of Research for the Classroom Teacher*. Joint Yearbook of the American Educational Research Association and the Department of Classroom Teachers. Washington: National Education Association, 1939. Pp. 318.

### GUIDES TO EDUCATIONAL LITERATURE

As the literature of educational inquiry expands in scope and improves in reliability, it becomes increasingly important for the research worker to canvass systematically the studies related to his problem. Of the numerous guides to educational literature prepared during recent years, three illustrations may be given. The *Education Index*, which began publication in 1929, is the most used educational guide in existence. Its purpose is to index all educational books in the United States, except elementary and high school textbooks; all articles in a large number of educational periodicals; other educational articles appearing in certain non-educational journals; and a large number of monographs, bulletins, reports, book reviews, courses of study, state documents, etc., of interest to educational workers. A valuable guide and summary, in terms of a variety of research references, is the *Review of Educational Research*, which began publication in 1931 and covers some fifteen sub-divisions of education within a three-year cycle. The discovery and examination of graduate theses involve more difficulty than the printed materials covered in the *Education Index* and in the *Review of Educational Research*, since most Masters' and many Doctors' studies are unpublished. However, good aids are available even for canvassing these unpublished materials. Beginning with 1926–27, the annual bibliographies of educational research issued by the United States Office of Education have been devoted almost entirely to an annotated listing of thesis titles.

### THE HISTORICAL METHOD

The decade of the nineteen thirties has witnessed the appearance of numerous volumes in the field of historiography which serve as the major guides to methodology for the writer of educational history. Only a composite summary statement[3] of the principles developed in these treatises on historical method can be given, covering the major problems of collection of data, criticism of data, and the writing of history. These historical works in a variety of social and scientific fields suggest that the past decade, which began as a period of world-wide economic and social disturbance and ended in another World War, may have turned to a newer type of history as an ally of the scientific movement, hoping thereby to solve at least in part the

[3] Carter V. Good, "Functional History of Education," *Journal of Educational Research*, XXXIII (October, 1939), 136–38.

staggering problems of human maladjustment. Each school system and school, subject and activity, institution and culture, laboratory and library, scientist and leader represents a story of evolution and development. Little of this history has been written.

History is an integrated narrative of past events, representing a critical search for the whole truth, with a field of inquiry as broad as the human past and life itself. Good history is both science and art; sound research is science and a masterful style of narration is art. The "seamless web" of history should be more than an almanac or chronicle of the unique events of the past; it has obligations for functional use by way of applying its data to current issues and problems.

For collection of data, documents and remains are the chief primary sources, the first witnesses to a fact and therefore the only solid bases for historical research, although classifications of sources have been broadened within recent years. The sources are subjected to external and internal criticism. External criticism is concerned with the genuineness of the document as such, and deals with data relating to form and appearance rather than meaning of contents. Internal criticism deals with the meaning and trustworthiness of statements within the document, that is, weighs the testimony of the document in relation to the truth. External criticism makes use of certain auxiliary sciences and a variety of procedures in dealing with forgeries and hoaxes, inventions and distortions, authorship and time, borrowings, etc. Internal criticism seeks to determine the literal meaning and the real meaning of statements, the competence of the observer, and the truthfulness and honesty of the observer or author.

Historical composition is a synthetic and constructive process which involves the mechanical problem of documentation, the logical problem of selection and arrangement of topics and subtopics, and the philosophical problem of interpretation. An appropriate combination of the chronological and topical plans for arrangement of topics and materials is recommended. Few works in history have been directly touched by one of the broad philosophies or theories of history, such as the evolutionary hypothesis or the rhythm-philosophy (cycle theory). Specific schools of historical interpretation, such as economic determinism, permit a pragmatic test, through use of historical materials, and are of more general interest to writers and users of history, although many of the best historical works have been written accord-

ing to the individual bent of the author rather than in keeping with some special interpretation or school of thought. As a rule, multiple causation is the explanation of any important historical event. The problem of historical perspective represents great difficulties because of tendencies to evaluate events and personages, distant in time or space, according to the standards of our own time and culture. Few histories of distinction lack a thesis or principle of synthesis, such as the effect of the frontier on American life and character. The development of a newer type of history, which is eclectic in approach and interpretation, necessarily depends on the contributions of many sciences for gathering and interpreting evidence and for training its workers.

### THE NORMATIVE-SURVEY METHOD

The normative-survey method is essentially a group of procedures for quantitative description of the general characteristics of a group or for discovering the conditions which prevail in a group of cases. In addition to gathering data regarding current conditions or present status, survey procedures are commonly used to identify the normal or typical situation or practice. The value of the survey approach, however, is not limited to the present; the historian profits greatly through using a series of surveys made at different times in the past. This statement applies with especial emphasis to social history, which recently has come to receive more nearly a fair share of the attention of research workers in history, sociology, and education.

The data-gathering techniques and instruments employed in the survey approach include: (1) intelligence, aptitude, personality, and achievement tests; (2) questionnaires; (3) quantitative analyses of such documentary materials as textbooks, larger bodies of literature, and assembled specimens (compositions, letters, tests, and reports); (4) interviews; (5) direct observations; and (6) such survey-appraisal procedures as rating scales, score cards, check lists, index numbers, and school or community surveys. These techniques for collecting data are not limited to normative-survey studies, but in certain instances are employed in the experimental, case, genetic, and correlation methods.

### THE EXPERIMENTAL METHOD

The comparatively recent development of educational experimentation has been dependent, in a large measure, on the invention and refinement of

the several types of standard tests, laboratory instruments, and statistical techniques. The methodology of the experimental approach, expressed in ideal terms, is to hold all factors constant except a single variable which is manipulated in order to measure its effect. For example, through eye-movement photography, the perception of the subject in looking at a picture may be analyzed, while an experimental factor or variable is manipulated (with the picture presented first in silhouette form and later in outline form). To cite a second illustration, equated or parallel groups of pupils, paired individually in terms of the major factors to be controlled, may take a standard test under different conditions of test administration—one group receiving encouraging directions and the other, discouraging directions.

The two examples of the preceding paragraph indicate that both the laboratory and classroom are available for experimental research. While laboratory work is tedious, expensive, and limited to small groups of subjects, it provides careful control of conditions, suitable apparatus and equipment, and individual study of the subjects. Laboratory investigations of the past few years indicate increased interest in the development of laboratory equipment and procedures, with applications to educational problems in the form of eye-movement studies, other types of photography, voice records, electroencephalography, tachistoscope studies, and investigations of visual factors in relation to reading. It should be emphasized, however, that the quality of scientific study resides not in the apparatus itself, no matter how elaborate, but in the way the data secured are employed for purposes of problem solving. Therefore, the function of laboratory equipment is to improve the process of observation through controlled conditions and accurate recording.

Group experimentation in the classroom or elsewhere (whether one-group, parallel-group, or rotation-group) encounters great difficulties in attempting to control numerous factors relating to the characteristics of pupils, the skill and personality of the teacher or teachers, school conditions, and extra-school activities. Before this method of problem solving can serve as a source for accurate generalization, many problems of control, measurement, and statistical technique remain to be solved, although real improvements in procedure have been made in recent years, with especially promising statistical contributions made by Fisher.[4] Certainly, the by-products of class-

[4] R. A. Fisher, *The Design of Experiments*. Second edition. Edinburgh, Scotland: Oliver and Boyd, 1937. Pp. 260.

room experimentation are exceedingly valuable by way of arousing interest in instructional procedures and in stimulating both teachers and pupils.

## THE CASE METHOD

The case method has undergone extensive application in such fields as medicine, social service, law, psychology, guidance, and education. It may be used to study some phenomenon or development in the life history of an object, person, or situation. Especially in sociology, the case method is used to investigate social situations in relation to the cultural or community setting. In medicine and law it has been common practice to organize the instructional materials in the form of cases.

The complete cycle of steps in case study includes: (1) determination of the status of the phenomenon under investigation, (2) collection of data relative to the circumstances associated with the given phenomenon, (3) identification of causal factors and diagnosis, (4) application of remedial or adjustment procedures, and (5) check-up or follow-up to determine the effect of the corrective measures applied. Factors associated with learning difficulty, and therefore important for case study and case records, are: physical, intellectual, pedagogical, emotional, social, and environmental. Organized according to the sequence of steps in case work, the case history record should include symptoms, examination results, history (health, school, family, home, and social contacts), diagnosis, treatment, and follow-up.

Recent applications of the case approach include: (1) tabulation of cases under significant categories to indicate the nature of the problems involved; (2) evaluation of programs of training or treatment through the subsequent history of the persons affected; (3) study of group patterns existing in families, classes, schools, or communities; (4) curriculum organization; (5) illustration and validation of statistically expressed findings; and (6) scientific generalization through the accumulation of a body of published case reports.[5] While the earlier case studies were concerned primarily with problems of maladjustment, quite appropriately a number of recent investigations have dealt with the talented, or well-adjusted, or normal individual.

[5] W. C. Olson, "The Case Method," in "Methods of Research in Education," pp. 483–90, *Review of Educational Research*, IX (December, 1939), 449–672.

### THE GENETIC METHOD[6]

Factors which have contributed to the genetic emphasis in psychology and in education are: recognition of the importance of the child as an individual, formulation of evolutionary doctrines, functionalism, behaviorism, psychoanalysis, Gestalt psychology, and development of measuring and recording instruments. The genetic approach at its best is a long-term, developmental study of the origin, rate, direction, and pattern of growth in the phenomena observed. The longitudinal or seriatim procedure, which involves repeated measurements or observations of the same individuals over a relatively long period of time, results in a more accurate picture of developmental sequences than may be secured through the cross-sectional technique, which compares the stages of growth reached simultaneously by different age-groups of children. While biological or physical growth sequences have most commonly been studied, the genetic method has been used more recently to trace the development of mental, social, and personality traits. Among the growth sequences currently studied are physical, motor, physiological, mental, and social characteristics, as well as thinking and reasoning, aggressiveness, sympathy, sociability, fears, language, and dressing, eating, and sleeping behavior.

Another recent trend is to investigate the causal factors which influence growth changes or developmental stages, rather than to rely solely on the descriptive approach, which typically stops with an account of developmental norms. Some of the factors which affect growth norms are cerebral birth injury, prematurity, restricted or accelerated practice, conditioning, praise and competition, home conditions, conflicts, and maturity levels. Therefore, it is frequently more important to know the stage of development which a child has reached, in terms of his own potentialities, than to compare him with group norms.

### ORGANIZED RESEARCH IN EDUCATION

Organized research is indebted to the philanthropic foundations for promotion of educational and social inquiry through endowments, fellowships, research subsidies, and publications. Among other national agencies especially active in the sponsorship and supervision of large-scale studies are the American Council on Education, the United States Office of Education,

[6] For an analytical, evaluative review of recent trends and studies, see Kai Jensen, "Genetic Method," in "Methods of Research in Education," pp. 491–97, *Review of Educational Research*, IX (December, 1939), 449–672.

and the Research Division of the National Education Association. Numerous national commissions and committees, in most instances with liberal financial support, have conducted important inquiries during the past decade. National, state, city, and university bureaus of educational research are a product of the past thirty years, with their most important contributions forthcoming during the latter half of that period.

It is not expected, however, that the rapid development of organized programs of research will preclude the necessity for exercise of ingenuity and originality on the part of the person who prefers to work alone or of small groups with a common interest. After all, large-scale patterns of research can rise in terms of excellence no higher than the abilities of the staff workers individually and collectively permit. There is work for all to do—some problems are so large and so complex as to require cooperative attack, while others lend themselves readily to investigation by competent individuals. Organized programs of investigation and individual research have made remarkable progress in a decade of financial stringency during which school budgets have been sharply curtailed. It may be that our educational institutions and agencies in a time of social maladjustment have seen in the search for truth and in education the one hope for solution of the staggering problems of society and even for preservation of democracy itself.

# THE RELIABILITY AND VALIDITY OF THE AMERICAN COUNCIL PSYCHOLOGICAL EXAMINATION, 1938 EDITION

MARGARET SEDER

*Editor's note:* The author presents in the paper herein reproduced timely data on the use of the 1938 revision of the American Council Psychological Examination.

DURING the last fifteen years, the Psychological Examination of the American Council on Education has been widely used as a test of academic aptitude at the college freshman level. A new edition of the examination has been prepared annually by L. L. Thurstone and Thelma Gwinn Thurstone. The content of the examination has been changed each year, but during the ten year period between 1927 and 1937, the general character of the examination was changed very little. Throughout this period, the test consisted of five parts, completion, arithmetic, artificial language, analogies, and opposites, and it was scored to yield five part scores and a total score.

The 1938 edition was altered by the addition of a subtest, a change in the method of timing the test, and the use of two subtotal scores in addition to the six part scores and the total score. The changes resulted in some questions concerning the proper uses of the test results for guidance purposes in a practical situation. This study represents an attempt to answer these questions by presenting data concerning the reliability and validity of the new edition and the meaning of the new subtotal scores.

The evidence to be discussed is based on scores of independent school pupils in Grades IX through XII who took the test during the 1938 fall testing program of the Educational Records Bureau.[1] Most of the data were derived from the scores of eleventh and twelfth grade pupils and most of the correlations are based on scores of pupils at a single grade level. The median total scores in the eleventh and twelfth grades of the independent schools furnishing data for this study were somewhat higher than the median total score for about ten thousand college freshmen, and the interquartile ranges for the eleventh and twelfth grades were a little smaller than the interquartile range for college freshman. One would anticipate, therefore, that the correlations in this study would be slightly lower than correlations based on a representative sampling of college freshmen.

[1] Although the college Freshman edition of the examination is too difficult for use in the average high school, it is suitable for use in many independent schools because of their selective character.

The first point investigated concerned the reliability of the 1938 edition of the American Council Psychological Examination. Previous editions required 60 minutes of testing time, but the time for each subtest included time for reading directions and working sample exercises in tests for which they were provided. The 1938 edition differed from previous editions in that directions and practice exercises were timed separately. The total time required for the portions of the examination that were to be scored was only 34 minutes, although the time required for administration of the entire examination was 56 minutes. It seemed rather unlikely that almost half of the total testing period was spent by any pupil who had taken previous editions of the test in reading directions and working sample exercises, and reports from persons who administered the 1938 test indicated that the time allowed for directions was usually too long. This fact, together with the fact that the total time allowed for directions and testing for the completion, arithmetic, and analogies tests was less than the time allowed for these tests last year, suggested that the reliability of the subtests and of the test as a whole might have been reduced seriously. On the other hand, several of the subtests, especially the arithmetic, analogies, and some-opposites tests, were rather heavily weighted with the speed factor, a fact which introduces a source of spurious consistency in split-half correlations since scores on the two halves tend to be more alike than scores for two forms, administered independently, would be. It was thought desirable to determine the reliabilities of the subtests and to see what effect the changes mentioned above and the addition of a number series test had on correlations between total scores for successive years.

The reliabilities of the subtests, the subtotal scores, and the total scores are reported in Table I.

These correlations are based on the scores of 106 eleventh-grade boys and were obtained by correlating scores for odd-numbered items with scores for even-numbered items and estimating the reliability of the whole by the Spearman–Brown formula. Also included in the table, for purposes of comparison, are reliability coefficients predicted in the same way by Traxler for the 1935 edition[2] and by the authors of the test for the 1930 edition.[3]

[2] Arthur E. Traxler, "A Study of the Results of the American Psychological Examination in the University of Chicago High School," (1936), unpublished.

[3] *Manual of Instructions, Psychological Examination for High School and College Freshmen,* (Washington: The American Council on Education, 1931), pp. 3–4.

TABLE I

RELIABILITY COEFFICIENTS BASED ON THE PART, SUBTOTAL, AND TOTAL SCORES OF 106 ELEVENTH-GRADE BOYS FOR THE 1938 EDITION, 78 TWELFTH-GRADE BOYS AND GIRLS FOR THE 1935 EDITION, AND 300 COLLEGE FRESHMEN FOR THE 1930 EDITION OF THE AMERICAN COUNCIL PSYCHOLOGICAL EXAMINATION*

| Part | 1938 edition r | 1938 edition mean | 1938 edition s.d. | 1935 ed. r | 1930 ed. r |
|---|---|---|---|---|---|
| Arithmetic | .793 | 8.5 | 2.8 | .789 | .817 |
| Analogies | .825 | 15.3 | 3.5 | .830 | .857 |
| Number Series | .797 | 11.2 | 3.4 | | |
| Q-Score | .866 | 35.0 | 7.5 | | |
| Completion | .787 | 10.1 | 4.0 | .873 | .81 |
| Artif. Language | .955 | 23.0 | 7.2 | .945 | .98 |
| Same-Opposite | .924 | 38.5 | 7.1 | .907 | .87 |
| L-Score | .953 | 71.6 | 14.5 | | |
| Total Score | .952 | 106.3 | 19.0 | .970 | .95 |

* Coefficients are odd–even reliabilities predicted by means of the Spearman–Brown formula.

The only case in which there is a large difference is in the completion test, which was the third most reliable test in the 1935 examination and is the least reliable test in the 1938 examination although it is not significantly less reliable than any of the quantitative tests. The artificial language and same-opposite tests in the 1938 edition are very reliable, and the artificial language test is as reliable as the test as a whole. The high reliability of these two tests is at least partly due to the fact that the mean number of items attempted in each test is many more than in any of the other tests, as well as to the fact that they are to some extent speed tests. The average student in this group had a higher score on the same-opposite test than on all of the quantitative tests together. The reliability of the Q-score probably would approach that of the L-score if the quantitative tests were lengthened. The reliability of the total score, .952, compares favorably with the reliability of the 1935 examination, .970 and with the reliability of the 1930 examination, .95. Apparently, the shorter time allowed has not lowered the reliabilities seriously. The reliability of the L-score is quite satisfactory, and although the Q-score is less reliable than the L-score, probably it is reliable enough for prediction within broad categories.

The effect of the changes in the examination might have been to lower correlations between this edition and preceding editions of the test even though a high internal consistency was maintained. There were a number of specific differences between the 1938 edition and previous editions. The arithmetic test was made much easier and the time limit shortened to make it more a speed test than a power test. The 1938 edition is the first in which

raw scores on some of the subtests were not weighted, thus the proportions which the various parts contributed to the total score were changed. The artificial language test was altered by having the student mark only wrong translations whereas previously he indicated whether each translation was correct or incorrect. Also, the number series test was included for the first time since 1926. The correlations reported in Table II indicate that although the alterations may have had some effect, they have not resulted in any substantial change in the abilities measured. Also presented in this table for purposes of comparison are correlations obtained by Traxler. Comparisons of correlations at the different grade levels reveal that the relation between the 1936 and 1937 editions is consistently higher than the relation between the 1937 and 1938 editions but that the differences are small. Correlations between the 1937 and 1938 editions are also about of the same magnitude as those reported by Traxler for earlier editions of the test. All correlations

TABLE II

CORRELATIONS BETWEEN TOTAL SCORES ON CONSECUTIVE FORMS OF THE AMERICAN COUNCIL PSYCHOLOGICAL EXAMINATION ADMINISTERED ONE YEAR APART

| | Grade Placement at time of Second Test | | | | | | | | |
|---|---|---|---|---|---|---|---|---|---|
| | X | | | XI | | | XII | | |
| Editions | No. | r | P.E. | No. | r | P.E. | No. | r | P.E. |
| 1938 with 1937 | 98 | .846 | ±.019 | 138 | .868 | ±.014 | 166 | .891 | ±.011 |
| 1937 with 1936 | 78 | .904 | ±.014 | 133 | .921 | ±.009 | 162 | .929 | ±.007 |
| 1935 with 1934* | | | | | | | 60 | .927 | ±.012 |
| 1934 with 1933* | | | | 60 | .859 | ±.023 | | | |
| 1933 with 1932* | 60 | .899 | ±.017 | | | | | | |

* Correlations reported by Traxler, op. cit.

indicate that scores on the 1938 edition of the test might have been predicted with a fair degree of accuracy for most individuals from their scores on the 1937 edition and with a high degree of accuracy for individuals at the extremes of the distributions.

The data here presented indicate that the reliability of the American Council Psychological Examination as a whole is quite high both from the standpoint of internal consistency and from the standpoint of correlation between two forms administered a year apart. Notwithstanding the alterations in the 1938 edition, it appears that the test as a whole is measuring abilities similar to those measured by previous editions and it is measuring these abilities about as reliably as earlier editions did.

The authors of the test state that five of the tests have been included in several test experiments with factorial analyses to determine the primary mental abilities and that these studies have justified the grouping of the six

tests in two classes as follows: quantitative tests—arithmetical reasoning, analogies, and number series; linguistic tests,—completion, artificial language, and same-opposite. The two subscores do not represent "primary mental abilities," but the authors say that they do represent two groups of abilities significant for college curricula that are dominantly linguistic or technical and that there seems to be justification for using the subscores as well as the total score for counseling.[4] In connection with the Q-scores and L-scores it was desired to study four problems: (1) what are the correlations among subtests and subtotals; (2) is reading comprehension more closely related to the L-score than to the Q-score; (3) how are the scores obtained from the Thurstone Tests for Primary Mental Abilities related to the Q-scores and L-scores; and (4) what are the relations between objective achievement tests in various subjects and the Q-scores and L-scores.

Intercorrelations of the tests based on 106 Grade XI boys, are listed in Table III. Also included are intercorrelations of tests of the 1934 edition reported by the Educational Records Bureau.[5] It is evident that we cannot expect the tests to be uncorrelated, nor is it desirable that the correlations be high, since then the tests would all be measuring the same set of abilities. It is necessary that there be more correlation among tests grouped into one subtotal than between the quantitative and linguistic tests if the subtotals are to have meaning. The intercorrelations among the quantitative subtests are all significant but rather low. The number series test is more highly

[4] *Manual of Instructions, Psychological Examination for College Freshmen* (Washington: The American Council on Education, 1938), p. 2.

[5] *Fall Testing Program in Independent Schools,* Educational Records Bulletin No. 14 (New York: The Educational Records Bureau, 1934), p. 17.

TABLE III

INTERCORRELATIONS OF SUBTESTS AND SUBTOTALS OF THE AMERICAN COUNCIL PSYCHOLOGICAL EXAMINATION BASED ON THE SCORES OF 106 ELEVENTH-GRADE BOYS[1] FOR THE 1938 EDITION AND 300 ELEVENTH-GRADE BOYS AND GIRLS[2] FOR THE 1934 EDITION

| Test | Arithmetic | Analogies | Number Series | Completion | Artif. Language | Same—Opposite | Q-Score | L-Score |
|---|---|---|---|---|---|---|---|---|
| Arithmetic | | .293 ± .060 | .462 ± .052 | .256 ± .062 | .304 ± .060 | .327 ± .059 | .710 ± .033 | .375 ± .056 |
| Analogies | .431 | | .412 ± .055 | .285 ± .061 | .309 ± .059 | .181 ± .063 | .748 ± .029 | .314 ± .059 |
| No. Series | | | | .106 ± .065 | .313 ± .059 | .127 ± .065 | .805 ± .023 | .242 ± .062 |
| Completion | .458 | .425 | | | .303 ± .060 | .677 ± .035 | .272 ± .060 | .743 ± .029 |
| Art. Lang. | .476 | .459 | | .491 | | .395 ± .054 | .393 ± .056 | .760 ± .028 |
| Same–Opp. | .383 | .343 | | .701 | .527 | | .260 ± .061 | .857 ± .017 |
| Q-Score | | | | | | | | .390 ± .056 |
| L-Score | | | | | | | | |

[1] Above the diagonal. [2] Below the diagonal.

related to each of the others than the arithmetical reasoning test is to the analogies test. Possibly the number series test has the number factor in common with the arithmetic test and the perception of relationships in common with the analogies test. It is evident that the number series test has more in common with the other two quantitative tests than with any of the linguistic tests.

It appears that the arithmetic test has no more relation to the analogies test, however, than it does to the artificial language or same-opposite test, and the analogies test is no more closely related to the arithmetic test than to the completion or artificial language test. It may well be that the sample was so selected as to make the relation between the arithmetic test and the analogies test appear smaller than it really is. Some such indication may be inferred from data reported previously where the correlation between these two tests is .431 and where all intercorrelations for the 1934 edition are higher than the corresponding ones for the 1938 edition. All three quantitative tests have substantial correlations with the Q-score, but of course these correlations are spuriously high since the parts are correlated with a whole in which they are included.

The artificial language test is a little more closely related to the same-opposite test than to the other four tests in the examination but it is no more closely related to the completion test than to the quantitative tests. The completion test is correlated with the same-opposite test to the extent of .677. It appears that in the linguistic subtotal, the same-opposite test plays a role analogous to that played by the number series test in the quantitative subtotal. All three linguistic tests correlate rather well with the L-score, and the correlation of the same-opposite test with the L-score is the highest of the three, at least partly because its contribution to the variance of the L-score is greater than that of either of the others. Again it should be pointed out that the correlations between the artificial language test and the completion and same-opposite tests are higher when based on the 1934 editions. It is not known whether this difference is due to a closer relationship between the tests in the 1934 edition or to a difference in range of ability in the two groups of subjects.

One other correlation in this table is of particular interest, the correlation of .390 between the Q-score and L-score. That this may be lower than the true correlation is indicated by the fact that correlations between these two scores based on other independent school groups are all higher. They

are .596 ± .040 based on 117 Grade IX pupils, .517 ± .038 based on 170 Grade XI pupils, .485 ± .028 based on 332 Grade X boys, .438 ± .025 based on 486 Grade XI boys, and .541 ± .021 based on 508 Grade XII boys.

As far as conclusions may be drawn from inspection of raw correlations, these data indicate that there is some basis for scoring the tests for linguistic and quantitative subtotals but that more research should be undertaken with less highly selected groups before the significance of such a classification can be evaluated. In a recent article, Thurstone reported a study of the scores of 300 college freshmen in which the correlations he obtained were somewhat higher generally than those of Table III. By factorial analysis of his correlation matrix he found that two common factors were sufficient to account for the intercorrelations, that the tests were correctly grouped, and that the two constellations were represented by an angular separation of about sixty degrees.[6]

A second criterion for judging the value of Q-scores and L-scores is the relation of each to reading comprehension, since a common sense judgment would lead one to the conclusion that reading ability should be more highly related to linguistic ability than to quantitative ability. Table IV shows the data bearing on this point. The correlations based on the scores of the ninth-

TABLE IV

CORRELATIONS BETWEEN TOTAL COMPREHENSION SCORES ON THE IOWA SILENT READING TEST AND THE Q-SCORES, L-SCORES, AND TOTAL SCORES OF THE AMERICAN COUNCIL PSYCHOLOGICAL EXAMINATION, 1938 EDITION, BASED ON THE SCORES OF 117 INDEPENDENT-SCHOOL PUPILS IN GRADE IX AND 170 IN GRADE XI

| | Grade IX r P.E. | Grade XI r P.E. |
|---|---|---|
| Iowa with Q-scores | .600 ± .040 | .611 ± .032 |
| Iowa with L-scores | .819 ± .021 | .817 ± .017 |
| Iowa with Total scores | .814 ± .022 | .814 ± .017 |

and eleventh-grade pupils are remarkably consistent and show that total comprehension scores on the Iowa tests are significantly more highly related to L-scores than to Q-scores. The differences between correlations of the Iowa test with L-scores and correlations of the Iowa test with total scores are not significant. Correlations between the Iowa test and both the Q-scores and

[6] L. L. Thurstone, Thelma Gwinn Thurstone, and Dorothy C. Adkins, "The 1938 Psychological Examination," *Educational Record*, XX (April, 1939), pp. 263–300.

L-scores are somewhat higher than the correlations reported between reading tests and language and non-language I.Q.'s based on the California Test of Mental Maturity,[7] but the correlations do support the validity of the distinction between quantitative and linguistic ability.

The third line of evidence to be discussed in connection with the Q-scores and L-scores has to do with their correlations with the abilities defined by the new Tests for Primary Mental Abilities, by L. L. Thurstone. These data are presented in Table V. In considering these correlations, it is important to know that the correlations between Q-scores and L-scores are

TABLE V

CORRELATIONS BETWEEN THE SEVEN PRIMARY ABILITIES AND Q-SCORES AND L-SCORES ON THE AMERICAN COUNCIL PSYCHOLOGICAL EXAMINATION, 1938 EDITION, BASED ON THE SCORES OF 112 ELEVENTH-GRADE AND 135 TWELFTH-GRADE BOYS

| Abilities | Grade XI | | Grade XII | |
|---|---|---|---|---|
| | Q-Score | L-Score | Q-Score | L-Score |
| P (Perceptual) | .376 ± .055 | .473 ± .050 | .385 ± .050 | .409 ± .048 |
| N (Number) | .264 ± .059 | .223 ± .061 | .352 ± .051 | .322 ± .052 |
| V (Verbal) | .381 ± .054 | .771 ± .025 | .573 ± .039 | .836 ± .017 |
| S (Spatial) | .519 ± .047 | .265 ± .059 | .443 ± .047 | .348 ± .051 |
| M (Memory) | .110 ± .063 | .207 ± .061 | .411 ± .048 | .418 ± .048 |
| I (Inductive Reasoning) | .635 ± .038 | .345 ± .059 | .595 ± .037 | .452 ± .046 |
| D (Deductive Reasoning) | .745 ± .028 | .511 ± .048 | .776 ± .023 | .534 ± .042 |

.536 ± .045 and .627 ± .035 based on these groups of eleventh- and twelfth-grade boys, respectively. The two tests for factor V, the verbal factor, are completion and same-opposite and are very similar to the tests of the same name in the Psychological Examination. Therefore, the correlation of factor V with the L-score may be expected to be of the magnitude of the correlation of either test with the L-score. This expectation is borne out by the data. Similarly, factor D, deductive reasoning, should correlate highly with the Q-score since two of the three tests determining D also occur in the Q-score. These tests are arithmetical reasoning and number series. We do find that these correlations are of the same magnitude as the correlations of these tests with the Q-score. It is interesting to notice that the Q-score is also positively related to the spatial factor (possibly because of the analogies test)

[7] Arthur E. Traxler, "A Study of the California Test of Mental Maturity," *Educational Records Bulletin*, No. 22, p. 57.

and especially to the inductive reasoning factor. The correlation of .573 between Q-score and the verbal factor for the twelfth graders may be due in part to the fact that the arithmetic problems are stated in words and in part to the high correlation between Q-scores and L-scores for this group.

The L-score is most closely associated with the verbal factor, and the correlation between L-scores and the deductive reasoning factor rank second in size. The inductive reasoning factor ranks third when the correlations based on the scores of the twelfth-grade pupils are considered, and the perceptual factor ranks third among the correlations based on the scores of the eleventh-grade pupils. For both grade groups, the Q-scores and L-scores show less correlation with the number factor than with any other.

The conclusions to be drawn from these data with regard to the usefulness for guidance purposes of the Q-scores and L-scores depend to a large extent on experimental findings with regard to the usefulness of scores obtained from the tests for the Primary Mental abilities. It is generally conceded that verbal ability and reasoning ability are important factors in scholarship. In view of the fact that the Q-scores and L-scores are rather highly related to these abilities as measured by the tests for the Primary Mental abilities, it appears that these scores should have considerable value in predicting scholarship.

The fourth line of evidence to be discussed in connection with the Q-scores and L-scores is their relation to achievement in various subject matter fields. For this part of the investigation, achievement test scores based on Cooperative Tests given in April, 1938, were used.

Correlations between Q-scores and scores on the Cooperative Tests are presented in Table VI and correlations between L-scores and Cooperative Test scores are given in Table VII. Of the five correlations for Q-scores and achievement test scores that are above .40, four are with mathematics. Although none of these is high, all are higher than corresponding correlations between L-scores and mathematics. The low correlation between Q-scores and algebra for eleventh-grade pupils with one year of training is not statistically significant, but the number of cases is very small. The fifth correlation above .40 is that for twelfth-grade pupils with four years of Latin. The highest correlations found in this part of the study are for L-scores and achievement in English; these range from .72 to .77 for the three grades. All of the correlations of L-scores with scores in Latin and in history are

above .40. The correlation between L-scores and biology and chemistry are also substantial, but the correlation between L-scores and scores in physics may not be significantly different from zero.

TABLE VI

CORRELATIONS BETWEEN SCORES ON COOPERATIVE ACHIEVEMENT TESTS IN VARIOUS FIELDS AND Q-SCORES OF THE AMERICAN COUNCIL PSYCHOLOGICAL EXAMINATION

| Subject | Grade 10 N | Grade 10 r | Grade 10 PE | Grade 11 N | Grade 11 r | Grade 11 PE | Grade 12 N | Grade 12 r | Grade 12 PE |
|---|---|---|---|---|---|---|---|---|---|
| English | 219 | .352 | .040 | 336 | .293 | .034 | 373 | .398 | .030 |
| French | | | | | | | | | |
| 1 Yr. | 112 | .203 | .061 | | | | | | |
| 2 Yrs. | 61 | .086 | .086 | 116 | .249 | .059 | | | |
| 3 Yrs. | | | | 140 | .236 | .054 | 124 | .341 | .054 |
| 4 yrs. | | | | | | | 161 | .152 | .052 |
| Latin | | | | | | | | | |
| 2 yrs. | 142 | .253 | .053 | | | | | | |
| 3 yrs. | | | | 193 | .242 | .045 | 30 | .188 | .119 |
| 4 yrs. | | | | | | | 62 | .412 | .071 |
| American History | | | | | | | 76 | .349 | .068 |
| Ancient History | | | | 45 | .272 | .093 | 34 | .313 | .105 |
| Modern History | | | | | | | 63 | .366 | .074 |
| Mathematics | | | | | | | | | |
| Algebra—1 yr. | 181 | .468 | .040 | 32 | .187 | .113 | | | |
| Algebra—2 yrs. | | | | 257 | .508 | .031 | 91 | .446 | .057 |
| Geometry | | | | | | | 248 | .446 | .034 |
| Biology | | | | 55 | .296 | .083 | | | |
| Physics | | | | | | | 75 | .230 | .074 |
| Chemistry | | | | | | | 82 | .383 | .063 |

TABLE VII

CORRELATIONS BETWEEN SCORES ON COOPERATIVE ACHIEVEMENT TESTS IN VARIOUS FIELDS AND L-SCORES OF THE AMERICAN COUNCIL PSYCHOLOGICAL EXAMINATION

| Subject | Grade 10 N | Grade 10 r | Grade 10 PE | Grade 11 N | Grade 11 r | Grade 11 PE | Grade 12 N | Grade 12 r | Grade 12 PE |
|---|---|---|---|---|---|---|---|---|---|
| English | 219 | .770 | .019 | 336 | .719 | .018 | 373 | .773 | .014 |
| French | | | | | | | | | |
| 1 Yr. | 112 | .348 | .056 | | | | | | |
| 2 Yrs. | 61 | .242 | .081 | 116 | .505 | .047 | | | |
| 3 Yrs. | | | | 140 | .400 | .048 | 124 | .569 | .041 |
| 4 Yrs. | | | | | | | 161 | .343 | .047 |
| Latin | | | | | | | | | |
| 2 Yrs. | 142 | .524 | .041 | | | | | | |
| 3 Yrs. | | | | 193 | .458 | .038 | 30 | .400 | .103 |
| 4 Yrs. | | | | | | | 62 | .590 | .055 |
| American History | | | | | | | 76 | .513 | .067 |
| Ancient History | | | | 45 | .472 | .078 | 34 | .445 | .093 |
| Modern History | | | | | | | 63 | .541 | .060 |
| Mathematics | | | | | | | | | |
| Algebra—1 Yr. | 181 | .410 | .042 | 32 | .001 | .120 | | | |
| Algebra—2 Yrs. | | | | 257 | .393 | .036 | 91 | .317 | .064 |
| Geometry | | | | | | | 248 | .335 | .038 |
| Biology | | | | 55 | .596 | .059 | | | |
| Physics | | | | | | | 75 | .275 | .072 |
| Chemistry | | | | | | | 82 | .548 | .052 |

TABLE VIII

ESTIMATED CORRELATIONS BETWEEN SCORES ON COOPERATIVE ACHIEVEMENT TESTS IN VARIOUS FIELDS AND Q, L, AND TOTAL SCORES OF THE AMERICAN COUNCIL PSYCHOLOGICAL EXAMINATION

| Subject | Grade 10 | | | Grade 11 | | | Grade 12 | | |
|---|---|---|---|---|---|---|---|---|---|
| | Q | L | Total | Q | L | Total | Q | L | Total |
| English | .352 | .770 | .707 | .293 | .719 | .654 | .398 | .773 | .727 |
| French | | | | | | | | | |
| 1 Yr. | .203 | .348 | .338 | | | | | | |
| 2 Yrs. | .086 | .242 | .212 | .249 | .505 | .478 | | | |
| 3 Yrs. | | | | .236 | .400 | .395 | .241 | .569 | .553 |
| 4 Yrs. | | | | | | | .152 | .343 | .313 |
| Latin | | | | | | | | | |
| 2 Yrs. | .253 | .524 | .487 | | | | | | |
| 3 Yrs. | | | | .242 | .458 | .441 | *.188 | .400 | .370 |
| 4 Yrs. | | | | | | | .412 | .590 | .597 |
| America History | | | | | | | .249 | .513 | .515 |
| Ancient History | | | | *.272 | .472 | .464 | *.313 | .445 | .451 |
| Modern History | | | | | | | .366 | .541 | .543 |
| Mathematics | | | | | | | | | |
| Algebra—1 Yr. | .468 | .410 | .495 | *.187 | .001 | .079 | | | |
| Algebra—2 Yrs. | | | | .507 | .393 | .506 | .446 | .217 | .406 |
| Geometry | | | | | | | .446 | .335 | .420 |
| Biology | | | | .296 | .596 | .565 | | | |
| Physics | | | | | | | .230 | .275 | .293 |
| Chemistry | | | | | | | .383 | .548 | .554 |

* These correlations based on fewer than 50 cases.

Comparison between correlations with Q-scores and L-scores for the same groups may be made from Table VIII where the correlations from Tables VI and VII are repeated. Table VIII also shows estimated correlations between achievement test scores and total scores on the American Council Psychological Examination. These correlations were not computed directly, but since correlations between Q-scores and L-scores for each grade were computed, an estimate of the relation of the total score to achievement test scores was made by means of the formula $r_{(Q+L)T} = \frac{r_{QT}\,\sigma_Q + r_{LT}\,\sigma_L}{\sigma_{Q+L}}$ Its use involves the assumption that the correlation between Q and L-scores for each achievement test group was the same as this correlation for the grade as a whole.

It is apparent that the L-scores are more closely related to scores in English, French, Latin and history than the Q-scores are. Also, Q-scores are more closely related to achievement test scores in mathematics than L-scores are. These data certainly support the contention that the subtotal scores are significant for curricula which are primarily linguistic or quantitative. Correlations between Q-scores and achievement test scores in the sciences are lower than correlations between L-scores and science. Although sciences are

ordinarily regarded as closely related to mathematics, in high school courses they are quite verbal in nature. Perhaps the scores of students in scientific curricula in colleges might show more correspondence with Q-scores than with L-scores.

In general, these comparisons support the validity of the distinction between Q-scores and L-scores. We find, however, that neither part score correlates significantly higher with achievement test scores than does the total score in any field except English. Therefore, it appears that, with the possible exception of English, the total score on the American Council Psychological Examination is as useful a basis for the prediction of success as measured by achievement tests as either of the subtotal scores.

## CONCLUSIONS

Three main conclusions are indicated by the data in this study:

1. The 1938 edition of the American Council Psychological Examination, although it has been changed considerably, seems to be similar to earlier editions as far as the total score is concerned. The total score continues to be internally consistent and is highly related to the total score on the 1937 edition of the examination.

2. Although the limitations of raw correlations for this kind of analysis should be kept in mind, the data tend to substantiate the grouping of the parts of the test into quantitative and linguistic subtotals.

3. The L-scores tend to be more highly correlated with measured achievement in English, foreign language, history, and science than the Q-scores; the reverse is true of correlations in the field of mathematics. It appears, however, that, except in English, the total score of the Psychological Examination is as useful as either of the subtotal scores in predicting success on a Cooperative achievement test.

# KNOWLEDGE OF ENGLISH ROOTS AND AFFIXES AS RELATED TO VOCABULARY AND LATIN STUDY

J. B. Carroll
*University of Minnesota*

*Editor's note:* The author is interested in morphemes, the smallest meaningful phonetic units in language, and their relation to vocabulary. While the author secures a statistically significant correlation between a Morpheme Recognition Test and vocabulary, he finds that the study of derivations in Latin does not necessarily aid in enlarging English vocabulary.

Morphemes are defined in linguistics as the smallest meaningful phonetic units in language. Examples of morphemes are words such as *hat* and *father,* as well as the suffixes *-er* and *-ess* which occur in *blacker* and *heiress.* Though not all roots, prefixes, and suffixes in English derived from Latin, Greek, or Germanic sources would be analyzed as true morphemes by the student of formal linguistics, they represent morphemes in the parent languages and hence for convenience will be termed morphemes throughout this article.

Knowledge of the meanings of morphemes found in English words is an area of vocabulary ability to which a good deal of attention has been paid by those interested in vocabulary enlargement. Whether this knowledge is to any degree correlated with vocabulary in the ordinary sense has not yet been adequately investigated. The objectives of the present study have been (1) to develop a fairly reliable test of the ability to recognize morphemes and their meanings; (2) to see what relation exists between knowledge of morphemes and vocabulary; and (3) to determine the relative influence of Latin study upon morpheme knowledge and vocabulary.

The latter objective was prompted by the practical problem as to whether derivation can be profitably taught in Latin classes, and if so, how this may be done. Positive influence of the study of Latin on vocabulary was indicated by Thorndike and Ruger (5), who showed that after a year of Latin, pupils gained about two and one-half times as much in vocabulary of Latin origin as did non-Latin pupils of the same initial vocabulary ability, but that in words of non-Latin origin the two groups gained about equally. In words of Latin origin, however, the average growth by schools varied "from practically nothing to almost the entire amount possible within the limits of the tests used." Hamblen (2) found that the amount of automatic

transfer from Latin to English vocabulary varies directly with the amount of specific training in derivation in Latin classes. Haskell (3) studied the effect of teaching derivation in English classes and found that the results were about equivalent to the automatic transfer in Latin classes where no specific attention was paid to derivation. Symonds and Penney (6), however, by giving intensive training in derivation in English classes found that the gain of the practice group was greater than that made by a class which had studied Latin for two years as previously tested by Thorndike, and were able to conclude that "if increase in English vocabulary is the goal, time spent in the English class on vocabulary is of much greater aid than time spent in the Latin class." The study of Latin was found to have only a relatively small effect on vocabulary by Douglass and Kittelson (1), who concluded that "the differences are so small as to invite suspicion concerning the degree to which Latin is so taught as to contribute most effectively to developing ability in English spelling, vocabulary, and grammar." Pond (4) found a biserial correlation of $+.29 \pm .08$ ($N = 208$) between vocabulary knowledge and participation in Latin study; he also found that for the 79 pupils who had studied Latin, the number of semesters of Latin study made almost as much independent contribution to vocabulary knowledge as did general intelligence. On the other hand, when he matched 30 pairs on the basis of participation or non-participation in Latin study, controlling other variables, there was no significant difference in vocabulary between the Latin and the non-Latin pupils.

It is probable that the discrepancies in the results of these studies are to some extent due to differences in the amount and kind of specific training in derivation given in the Latin classes involved. There seems to be no necessary influence of the study of Latin *per se* on English vocabulary, when the effects of other variables such as general ability are held constant. Those who argue for the value of Latin in enlarging vocabularies assume that the mere knowledge of English roots and affixes derived from Latin—a knowledge presumably automatically obtained from the study of Latin—will automatically aid in enlarging an individual's English vocabulary. The present study is in part an attempt to test this assumption.

The Morpheme Recognition Test was developed with the additional purpose of stimulating interest in word derivation and thereby aiding students to enlarge their vocabularies.

## PROCEDURE AND RESULTS

It was first necessary to develop a fairly reliable instrument for testing knowledge of English roots, prefixes, and suffixes. Since it was desired to test a generalized ability rather than specific knowledge of, say, morphemes derived from Latin, a sampling of roots, prefixes, and suffixes from all sources was included in the test. Training in derivation even in a Latin class should be expected to make students more aware of the component parts of English words. At the outset, several "How to Study" sections composed of University students were given a test of sheer recall for the meanings of a number of prefixes, roots, and suffixes. They were also asked to give examples of words composed of these units. From the correct and incorrect responses on this preliminary test, Form A of the Morpheme Recognition Test was constructed. The morphemes used in Form A were as follows:

Roots: Latin: -clud-; -dict-; -duct-; -fect-,-fic-; -fin-; -jac-,-ject-; -magn-; -pell-,-puls-; -pon-,-pos-; -rupt-; -sect-; -tact-.
Greek: -gram-,-graph-.

Prefixes: Latin: ab-; ad-; con-,com-; de-; di-,dis-; ex-,e-,extra-; in-, im- (= Eng. *in*); in-, im- (= Eng. *not*); inter-; per-; pre-; sub-; trans-.
Greek: dia-.

Suffixes: Latin: -ant; -able,-ible; -fy; -ous; -tude.
Germanic: -en (causative); -er (comparative); -er (agentive); -ly.

The fore-exercise is typical of the 36 items in the test proper:

| | |
|---|---|
| ☐ 1. ready | ☐ 1. writing |
| ☐ 2. read | |
| ☐ 3. regression | ☐ 2. back, again |
| ☐ 4. region | |
| ☐ 5. repeat | ☐ 3. true |
| ☐ 6. return | |
| ☐ 7. rectangle | ☐ 4. very |

The instructions which preceded the fore-exercise included the following, which will serve to explain the item:

"In the LEFT-HAND column of each problem there are several words which have some common element of meaning. This common element of

meaning is represented by groups of letters in the words. But the group of letters which is found in each word *does not have the same meaning in all of them*. You are to find all the words in which the group of letters has the *same* meaning. Place a cross (X) in the box to the left of all the words which have that common element of meaning. In the RIGHT-HAND column of the problem are 4 words or phrases, *only one* of which is the English equivalent or meaning of the language unit common to the words you have just marked. Place a cross in the box to the left of the correct word or phrase."

After doing the fore-exercise, the students were told the correct responses and the item was fully explained to them. They were told that the fore-exercise was similar to the items in the test, and warned that the letters representing the common meaning might occur anywhere in the word; that the common element might not be exactly identical in all the words in the left-hand column; and that the common element of meaning is not the whole meaning of the word but merely adds something to the meaning of the rest of the word. Finally, they were told, "Most important, remember that there are anywhere from 2 to 5 or 6 words in the left-hand column which belong together. You will be penalized, however, for wrong answers."

Form A was administered to approximately 180 students in "How to Study" sections and elementary psychology laboratory classes, and separate scores were obtained for the "examples" (left-hand column in each item) and for the "meanings" (right-hand column). The scores on meanings correlated with the scores on examples to the extent of .842 ± .029. The total score was computed as the examples score (scored right minus wrong) plus twice the meanings score. The odd-even reliabilities of the separate parts of Form A were found to be:

| | r and $\sigma_r$ | Raised by Spearman–Brown formula |
|---|---|---|
| Meanings | .670 ± .054 | .803 |
| Examples—correct responses | .890 ± .020 | .942 |
| Examples—right minus wrong | .906 ± .018 | .951 |
| Total Score | .840 ± .029 | .914 |

Although the reliability of the right minus wrong method of scoring the examples was not significantly higher than that of scoring the correct responses, it was decided to continue using the former method in order to

avoid testing willingness to guess. Nevertheless, the high correlation between examples scores and meanings scores, where variability in guessing should not occur, probably indicates that guessing is not an important factor.

In the hope of raising the reliabilities of the test, an item analysis was carried out to determine which items were not sufficiently discriminating to justify inclusion. It was found that the items on in-,im-(= Eng. *in*); -pell-,-puls-; -fect-,-fic-; -ly-; -en-; and -ant would have to be discarded for this reason, and hence Form B included only the 30 remaining items, with certain modifications suggested by the reactions of the students to the test. The items were also arranged in order of difficulty. Form B was administered as a work-limit test to about 90 students in sophomore psychology laboratory classes at the University of Minnesota. Data were also collected on the following variables:

1. English Recognition Vocabulary Test, Form 1, by Robert H. Seashore and Lois D. Eckerson. Score was the number correct on the 173 items of the first part of the test, entitled "General Terms."

2. Revised Alpha Examination Form 5, administered with shortened-time-limits as is customary in elementary psychology laboratory classes at the University of Minnesota.

3. Number of years of Latin study, both in secondary school and college.

Table I presents the odd-even reliabilities and other data on the internal consistency of Form B. The correlation between example and meaning scores for Form B was somewhat higher than for Form A; this significantly higher correlation, which in a sense is a measure of reliability, seems to justify the additional effort expended in constructing Form B.

TABLE I

RELIABILITY AND INTERNAL CONSISTENCY OF THE MORPHEME RECOGNITION TESTS

| | Form B | | | Form A |
|---|---|---|---|---|
| | Uncorrected r | Corrected r(x 2) | Corrected to compare in length with Form A: r(x 1.20) | Uncorrected r |
| Total Score: | .805 ± .037 | .893 | .832 | .840 ± .029 |
| Examples | .774 ± .042 | .870 | .805 | .906 ± .018 |
| Meanings | .656 ± .065 | .792 | .696 | .670 ± .054 |
| Meanings corr. with Examples: | .921 ± .016 | --- | .936 | .842 ± .029 |

Table II, which gives the means and standard deviations of the scores on the Morpheme Recognition, Vocabulary and Army Alpha tests, reveals

a fairly wide range of ability on the morpheme test but apparently a fairly restricted range of ability on the vocabulary test. Hence, some of the correlations reported in this study may suffer from a restricted range of ability, but any conclusions which may positively be drawn from such correlations should, of course, be interpreted as even more significant. Table III is included to show the distribution of the number of years of Latin study.

TABLE II

MEANS AND STANDARD DEVIATIONS OF SCORES ON THE MORPHEME, VOCABULARY, AND ARMY ALPHA TESTS (N = 76)

| | Highest Possible Score | Mean | S.D. |
|---|---|---|---|
| Morpheme —Total Score | 167 | 93.91 | 23.45 |
| Examples | 107 | 59.43 | 14.48 |
| Meanings | 30 | 17.11 | 4.48 |
| Vocabulary —Total Score | 173 | 134.87 | 6.64 |
| Army Alpha—Total Score | --- | 143.18 | 18.10 |

TABLE III

DISTRIBUTION OF THE NUMBER OF YEARS OF LATIN STUDY

| Years of Latin Study | f |
|---|---|
| 0 | 33 |
| .5–1 | 8 |
| 1.5–2 | 29 |
| 2.5–3 | 4 |
| 3.5–4 | 2 |
| | 76 |

The main problem of the investigation, namely, to examine the interrelationships among morpheme recognition ability, vocabulary, general ability, and the study of Latin, was attacked by a correlational analysis. The correlations used throughout are based on 76 cases, the number of cases for which the data are complete. The correlations of the variables with Latin study are biserial r's, where the dichotomy in the distribution of years of Latin study is made between zero years of study and ½ or more years of study. Thus, in effect the correlations are with exposure or non-exposure to Latin study. These biserial co-efficients are transmuted into corresponding Pearsonian r's for use in the partial regression equations.

The zero-order correlations among the variables studied are presented in Table IV. The differences in the correlations of vocabulary and Latin with each of the separate scores on the morpheme recognition test are not significant, but this probably excludes the possibility that the morpheme recognition test is merely a measure of vocabulary. If it were, it might rea-

TABLE IV

CORRELATIONS AND STANDARD ERRORS
(Not Corrected for Attenuation)

| | Morpheme Recognition Scores | | | | |
|---|---|---|---|---|---|
| | Total Score | Examples | Meanings | Vocabulary | Army Alpha |
| Vocabulary | .427 ± .094 | .270 ± .106 | .423 ± .094 | | |
| Army Alpha | .251 ± .107 | .256 ± .107 | .272 ± .106 | .468 ± .090 | |
| Latin ($r_{bis}$) | .489 ± .117 | .441 ± .123 | .555 ± .109 | .081 ± .143 | .118 ± .143 |
| Latin (Pearsonian r) | .388 ± .098 | .350 ± .101 | .441 ± .093 | .065 ± .111 | .094 ± .105 |

sonably be expected that the correlation of vocabulary with examples scores would be significantly higher than the corresponding correlations with meanings scores, since a large vocabulary is required less by the meanings part of each item than by the examples part, which often contains infrequent and unfamiliar words. As a matter of fact, the morpheme recognition test correlates with vocabulary only to the extent of .427. The effect of Latin is more marked in the case of the meanings than in the case of the examples, as might be expected, but the difference between the r's is not significant.

The correlational analysis (Table V) was approached from two standpoints: (1) prediction of morpheme scores from the other variables, and (2) prediction of vocabulary scores from the other variables. First let us consider the prediction of morpheme scores. The multiple correlation between morpheme recognition score as dependent variable and vocabulary, Army Alpha, and Latin study as independent variables is .559. Of the independent variables, vocabulary and Latin study make significant and approximately equal contributions, as shown by $\beta$ coefficients of .386 and .360 respectively, but Army Alpha makes no significant independent contribution. The ability represented by the Morpheme Recognition Test is hence associated to some extent with both vocabulary and Latin study, but is independent of that part of general ability which is not covered by vocabulary ability. Since the zero-order correlation between Morpheme Recognition scores and Army Alpha, .251 ± .107, is reduced to .064 when vocabulary is partialed out, we may conclude that general ability as measured by Army Alpha only affects morpheme recognition ability insofar as general ability affects vocabulary. Furthermore, the study of Latin affects morpheme recognition ability independently of the two other variables studied. It is also found that prediction of Morpheme Recognition scores solely from vocabulary and Latin study is just as efficient as prediction from all three independent variables.

TABLE V

SUMMARY OF CORRELATIONAL ANALYSIS

N = 76

Variables:

1. Morpheme Recognition, Form B, Total Score
2. English Recognition Vocabulary Test, Form 1, Total Score
3. Revised Alpha Examination, Form 5, Total Score
4. Exposure to Latin

| Prediction of Morpheme Score (1) | Prediction of Vocabulary Score (2) |
|---|---|
| I. From 3 variables (2, 3, 4): | I. From 3 variables (1, 3, 4): |
| $\beta_{12.34} = .386$ $p < .01$* | $\beta_{21.34} = .375$ $p < .01$ |
| $\beta_{13.24} = .036$ $p > .05$ | $\beta_{23.14} = .385$ $p < .01$ |
| $\beta_{14.23} = .360$ $p < .01$ | $\beta_{24.13} = -.115$ $p > .05$ |
| $R_{1.234} = .559 \pm .081$ | $R_{2.134} = .577 \pm .079$ |
| II. From variables 2 and 4: | II. From variables 1 and 3: |
| $\beta_{12.4} = .403$ $p < .01$ | $\beta_{21.3} = .330$ $p < .01$ |
| $\beta_{14.2} = .362$ $p < .01$ | $\beta_{23.1} = .385$ $p < .01$ |
| $R_{1.24} = .559 \pm .081$ | $R_{2.13} = .566 \pm .080$ |

* This is to be read: The probability is less than 1 in 100 that the contribution of this variable could be accounted for merely on the basis of chance.

The prediction of vocabulary scores presents a slightly different picture. The multiple correlation coefficient between vocabulary and the other 3 variables is .577 and lies at about the same level of prediction efficiency as the corresponding coefficient in the case of morpheme recognition prediction. Here, the $\beta$ coefficients show that Army Alpha scores and morpheme recognition scores each make significant contributions to the prediction of the vocabulary score, whereas exposure to Latin seems to have if anything a slightly negative effect on vocabulary. Prediction of vocabulary from morpheme recognition and Army Alpha scores alone is almost as good as with the addition of Latin study.

As to the factors determining vocabulary, the interpretation may be ventured that besides general ability, there is some separate entity, independent of intelligence and not affected by Latin study, but associated with morpheme-recognition ability, which is correlated positively with vocabulary. This entity might tentatively be described as "interest in words" or "awareness of linguistic units."*

Concerning the effect of Latin study on morpheme knowledge and on vocabulary, we have the paradoxical situation that whereas Latin definitely influences the ability to recognize morphemes and the knowledge of their meanings, it has no necessary effect on English vocabulary. This is true in

* It is hoped that a factor analysis of verbal ability, now in progress, will make these relations clearer.

spite of the fact that morpheme recognition ability is partly related to vocabulary. The interpretation seems to follow that the teaching of word derivation *per se* in Latin classes does not aid in enlarging English vocabularies unless, possibly, specific attention is directed toward words not already known or used by the students. Word derivation as commonly taught in first and second year Latin classes is often directed largely to the commoner words which are derived from Latin; the teacher seems to be content to impress the student with the high percentage of English words which have come down from the classical languages. Instruction should be extended to cover those less common words which are nevertheless of importance in conveying fine distinctions of meaning. It is quite possible, besides, that derivation taught in Latin classes, supported by a more thorough knowledge of Latin than would be obtainable otherwise, would be a more adequate basis for enlarging English vocabularies than a mere smattering of assorted roots and affixes even well taught in English classes. Knowledge of word derivation as a mnemonic device has often aided the writer in retaining the meanings of unusual words.

## SUMMARY AND CONCLUSIONS

1. Both for scientific purposes and for the stimulation of interest in derivation, a test of the knowledge of roots, prefixes, and suffixes in English words was developed and found to have a corrected reliability of .893. This test is called the Morpheme Recognition Test.

2. The Morpheme Recognition Test correlated .427 with the Seashore–Eckerson Vocabulary Test, .251 with the Revised Alpha Examination, Form 5, and .489 (biserial r) with participation or non-participation in Latin study.

3. By the multiple regression technique it was found that only Latin and vocabulary made significant contributions to the prediction of morpheme knowledge, and only Army Alpha and the morpheme test made significant contributions to the prediction of vocabulary.

4. Since the results show that the study of Latin influences morpheme knowledge but not vocabulary, the teaching of word derivation in Latin classes does not necessarily aid in enlarging English vocabularies. It is quite possible, however, that the teaching of derivation could be effective if specific attention were paid to the derivation of less common words not familiar to the students.

REFERENCES

1. Douglass, H. R., and Kittelson, C. "The Transfer of Training in High School Latin to English Grammar, Spelling, and Vocabulary," *Journal of Experimental Education,* IV (September, 1935), pp. 26–33.
2. Hamblen, A. A. A Statistical Study to Determine the Amount of Automatic Transfer from a Study of Latin to a Knowledge of English Derivatives, and to Determine the Extent to which this Amount may be Increased by Conscious Adaptation of Content and Method to the Attainment of this Objective. Doctor's Dissertation, University of Pennsylvania, 1924.
3. Haskell, R. I. A Statistical Study of the Comparative Results Produced by Teaching Derivation in the Ninth-Grade Latin Classroom and in the Ninth-Grade English Classroom to non-Latin pupils. Doctor's Dissertation, University of Pennsylvania, 1924.
4. Pond, F. L. "Influence of the Study of Latin on Word Knowledge," *School Review,* XLVI (October, 1938), pp. 611–618.
5. Thorndike, E. L., and Ruger, G. J. "The Effect of First-Year Latin Upon a Knowledge of English Words of Latin Derivation," *School and Society,* XVIII (September, 1923), pp. 260–270.
6. Symonds, P. M., and Penney, E. M. "The Increasing of English Vocabulary in the English Class," *Journal of Educational Research,* XV (February, 1927), pp. 93–103.

# COMPARISON OF SCHOOL ACHIEVEMENT OF HIGH-SCHOOL PUPILS WHO HAD PART-TIME EMPLOYMENT WITH AVERAGES OF THEIR RESPECTIVE GROUPS

E. L. RODGERS
*Phoenix Union High School*

*Editor's note:* What are the effects of employment upon scholarship? The author presents important data upon the subject collected from pupils enrolled in the Phoenix, Arizona, High School.

THE problem indicated in the subject title was investigated as part of "A Study of the Economic Activities of Pupils in the Phoenix Union High School."[1] The scope of investigation was limited to the boys and girls of the freshman, sophomore and junior classes of the Phoenix Union High School during the academic year 1936–7.

*Procedure.* Questionnaires were submitted to the pupils and the data thus obtained were basic as to the extent of part-time employment. Questionnaire data were classified by grade and sex to show (1) who had had part-time employment; (2) who had been employed fewer than twenty hours per week; (3) who had been employed more than twenty hours but fewer than thirty-five hours per week; and (4) who had been employed thirty-five hours or more a week.

School achievement of part-time workers was checked against the average of the particular group of which each part-time worker was a part. In making comparisons the following named items were considered (1) intelligence ratings; (2) grade point averages; (3) percentage of period absences; and (4) percentage of subject failures. No attempt was made to control other factors.

*Freshman boys.* From an analysis of Table I, which shows records of groups of freshman boys who worked and the class averages, the following generalizations were drawn. The average intelligence quotient rating for the group working thirty-five or more hours a week was 3.45 lower than for the group average. The intelligence rating was likewise unfavorable to the main division of the class containing boys who were working fewer hours. This would indicate that freshman boys with relatively low intelligence ratings

[1] Edmond L. Rodgers. "A Study of the Economic Activities of Pupils in the Phoenix Union High School (Unpublished Master's Thesis, University of Southern California, 1938), 100 pp.

spend more time at work not connected with school than do pupils with higher intelligence ratings.

TABLE I

COMPARISON OF I.Q., GRADE POINTS EARNED, PERIOD ABSENCES, AND SUBJECT FAILURES OF FRESHMAN BOYS WORKING PART TIME FOR PAY[a] WITH ALL FRESHMAN BOYS

| Number of boys | Amount of time employed | Average I.Q. | Grade points | Percent of period absences | Percent of subject failures |
|---|---|---|---|---|---|
| Class | | 106.20 | 14.2 | 4.7 | 5.6 |
| 270[b] | | 105.50 | 14.2 | 5.3 | 8.2 |
| 22 | 20 to 35 hrs. | 107.09 | 13.4 | 6.3 | 11.2 |
| 17 | 35 or more hours | 102.75 | 12.6 | 8.1 | 12.5 |

[a] Consideration confined to work activity during school year.
[b] Two hundred seventy represents the total number of earners belonging to the freshman boys.
Note—This table should be read as follows: Averaging the entire class, the I.Q. was 106.2; the grade points earned was 14.2; the period absences in percent was 4.7, and the percent of subject failures was 5.6.

These data indicate that the grade average for the class as a whole was not lowered because of the time spent at outside work. Grade point averages for each group working more than twenty hours were lowered. Absence and subject failures for each division of freshman boys having part-time employment increased directly with the number of hours worked a week. With the group working as much as thirty-five hours a week, both absences and tardiness increased approximately 100 percent over the average for the class.

*Freshman girls.* From an examination of Table II, it is seen that the group of freshman girls working had an average I.Q. rating two points lower than the average of all the girls in this class.

TABLE II

COMPARISON OF I.Q., GRADE POINTS EARNED, PERIOD ABSENCES, AND SUBJECT FAILURES OF FRESHMAN GIRLS WORKING PART TIME FOR PAY[a] WITH ALL FRESHMAN GIRLS

| Group | Average I.Q. | Grade points earned | Percent of period absences | Percent of subject failures |
|---|---|---|---|---|
| 123[b] | 111.0 | 18.25 | 3.7 | 2.0 |
| 86 girls working part time | 109.0 | 16.80 | 5.1 | 4.4 |

[a] Consideration confined to work activity during school year.
[b] Representative sampling of class.
Note—This table should be read as follows: Of the 123 girls forming a sampling of the class, the average I.Q. was 111.0; the average number of grade points earned was 18.25; the percent of absences, 3.7, and the percent of subject failures was 2.0.

The grade point average for the group having part-time employment was 1.45 lower than for the entire group.

The period absences and the subject failures were each significantly higher for the group having part-time employment.

*Sophomore boys.* Table III indicates that sophomore boys working part time had slightly lower scholastic achievement than did the group as a whole. For the working group as a whole compared with all the sophomore boys, the following were indicated:

1. Grade point average was .55 of a point lower.
2. Absence average was 1.1 percent higher.
3. Subject failure average was 2.0 percent higher.

TABLE III

COMPARISON OF I.Q., GRADE POINTS EARNED, PERIOD ABSENCES, AND SUBJECT FAILURES OF SOPHOMORE BOYS WORKING PART TIME FOR PAY[a] WITH ALL SOPHOMORE BOYS

| Number of boys | Amount of time employed | Average I.Q. | Grade points | Percent of period absences | Percent of subject failures |
|---|---|---|---|---|---|
| Class[b] | | 110.5 | 15.10 | 4.4 | 4.9 |
| 251[c] | | 109.4 | 14.55 | 5.5 | 7.8 |
| 18 | 20 to 35 hours per week | 107.0 | 13.80 | 6.2 | 9.7 |
| 14 | 35 or more hours per week | 110.3 | 14.30 | 3.3 | 9.8 |

[a] Consideration confined to work activities during school year.
[b] Determined by sampling of 126 members of class.
[c] The number 251 represents the total number of earners belonging to the group of sophomore boys.

Sophomore boys working twenty to thirty-five hours a week had an average intelligence rating 3.5 points below the group's average. From the data on this group the following facts were learned:

1. Grade point average was 1.3 below that of the class.
2. The percentage of period absences was 1.8 higher than for the group.
3. Subject failures were 4.8 percent higher than for the group.

For the fourteen boys working thirty-five or more hours a week and having an intelligence rating approximately the same as for the whole group of sophomore boys, the following was disclosed:

1. The grade point average was .8 below the class average.
2. The absence average was 1.1 percent lower than for the class.
3. The subject failure record showed 4.9 percent higher than for the class.

*Sophomore girls.* Table IV compares achievement of sophomore girls working with the average performance of all the girls of the class. The data indicate consistently that the earning group of this class of girls had achievement records averaging approximately the same as the whole group.

TABLE IV

COMPARISON OF I.Q., GRADE POINTS EARNED, PERIOD ABSENCES, AND SUBJECT FAILURES OF SOPHOMORE GIRLS WORKING PART TIME FOR PAY[a] WITH ALL THE SOPHOMORE GIRLS

| Group | I.Q. | Average Grade points earned | Percent of period absences | Percent of subject failures |
|---|---|---|---|---|
| Class sampling of 126 girls | 109.5 | 17.1 | 4.7 | 3.8 |
| 61 girls working part time | 108.6 | 16.8 | 4.7 | 3.5 |

[a] Consideration confined to work activities during the school year.

*Junior boys.* Data from Table V, which compares the different groups of junior boys, indicate the following:

1. The average intelligence rating of pupils working part time was 1.5 points higher than for the class as a whole.
2. The grade point average for the earning group was 1.29 point higher than for the average of the entire group.
3. There was only a slight difference between the absence records and between the subject failures of the two groups compared.

TABLE V

COMPARISON OF I.Q., GRADE POINTS EARNED, PERIOD ABSENCES, AND SUBJECT FAILURES OF JUNIOR BOYS WORKING PART TIME FOR PAY[a] WITH ALL JUNIOR BOYS

| Number of boys | Amount of time employed | I.Q. | Average Grade points | Percent of period absences | Percent of subject failures |
|---|---|---|---|---|---|
| Class[b] | | 108.0 | 15.56 | 4.7 | 3.6 |
| 126[c] | | 109.5 | 16.85 | 4.6 | 3.3 |
| 17 | 35 or more hours per week | 108.2 | 13.40 | 6.9 | 7.3 |

[a] Consideration confined to work activities during school year.
[b] Determined by sampling of 146 members of the class.
[c] The number 126 represents the total number of earners belonging to the group of junior boys.

Comparison of the records of the seventeen junior boys who worked thirty-five hours or more a week indicated the following:

1. The intelligence average was approximately the same as for the class.
2. The grade point average was 2.16 points below the class average.
3. The period absences average was 2.2 percent higher.
4. The subject failures average was 3.7 percent higher.

*Junior girls.* A comparison of the entire class of junior girls with those who worked part time (Table VI) indicates:

1. That the difference in intelligence averages was inconsequential.
2. That the difference in the averages of achievement was negligible.

The comparison between the class and those employed more than twenty hours a week gave a somewhat different picture. Here it is noticed (1) that the employed group had a grade point average 1.7 higher than the class average; (2) that the period absence record was 3.5 percent higher than for the class; and (3) that the subject failure record was .5 percent less than for the class.

TABLE VI

COMPARISON OF I.Q., GRADE POINTS EARNED, PERIOD ABSENCES, AND SUBJECT FAILURES OF JUNIOR GIRLS WORKING PART TIME FOR PAY[a] WITH ALL JUNIOR GIRLS

| Number of girls | Amount of time employed | Average I.Q. | Grade points | Percent of period absences | Percent of subject failures |
|---|---|---|---|---|---|
| Class[b] | | 111.6 | 18.4 | 5.2 | 1.7 |
| 65[c] | | 110.5 | 18.6 | 5.6 | 1.7 |
| 10 | 20 to 35 hours per week | 110.0 | 20.1 | 8.7 | 1.2 |

[a] Consideration confined to work activities during school year.
[b] Determined by a representative sampling of 123 members of the class.
[c] The number sixty-five represents the total number of earners belonging to the group of junior girls.

*Comparison of failures.* 1. *Boys.* Figure 1 reveals the decrease in subject failure in moving from the lower to higher classes among the boys. It also shows that percentages of subject failures were correspondingly less among the earners.

With the freshman groups no significant difference in intelligence rating was found as indicated in Table I. With the sophomore groups it may be seen from the data in Table III that the average intelligence rating was 1.1 percent below that of the class average. It is therefore possible that the relative high percentages of subject failures among the freshman and sophomore boys who were employed part time resulted from relatively low effort or from the effects of time and energy spent on affairs that did not pertain to school.

The junior group of wage earners, having a 1.5 points higher average intelligence rating than the class average, had a better achievement record in every particular.

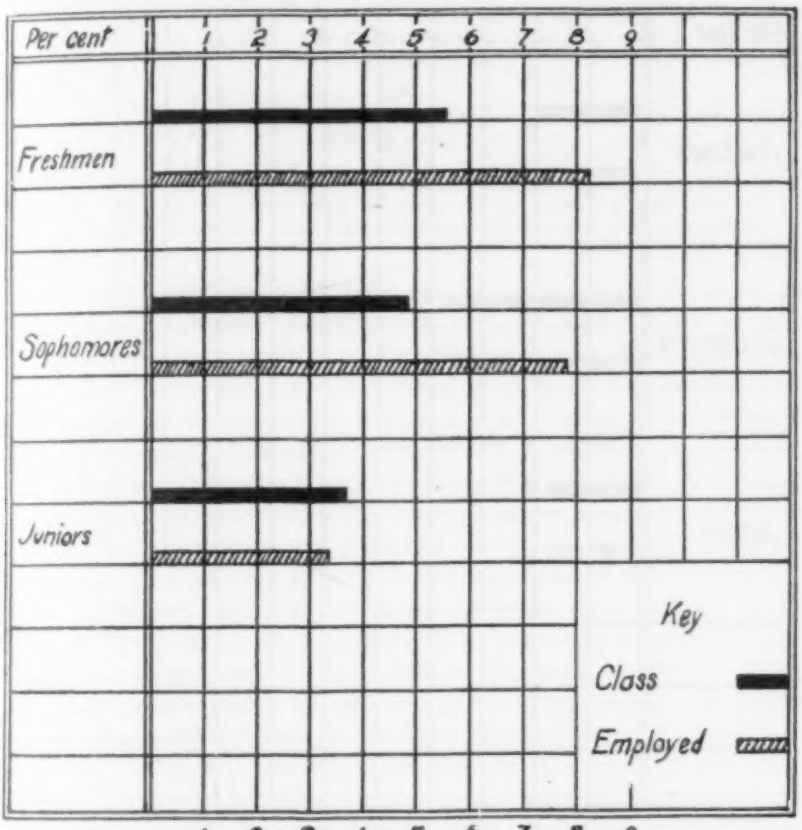


FIGURE 1. SUBJECT FAILURES OF BOYS ACCORDING TO CLASS AND EMPLOYED GROUPS

2. *Girls.* Figure 2 indicates that despite the process of selection due to failure among girls, the freshman class had a lower percentage of failures than did the second-year class. In the junior group the percentage of failures was lower than in either of the two lower grades. In the freshman year alone did comparative records of girl earners show to disadvantage. With the freshman group, also, the average intelligence rating was indicated in Table II to be two points below the average for the group.

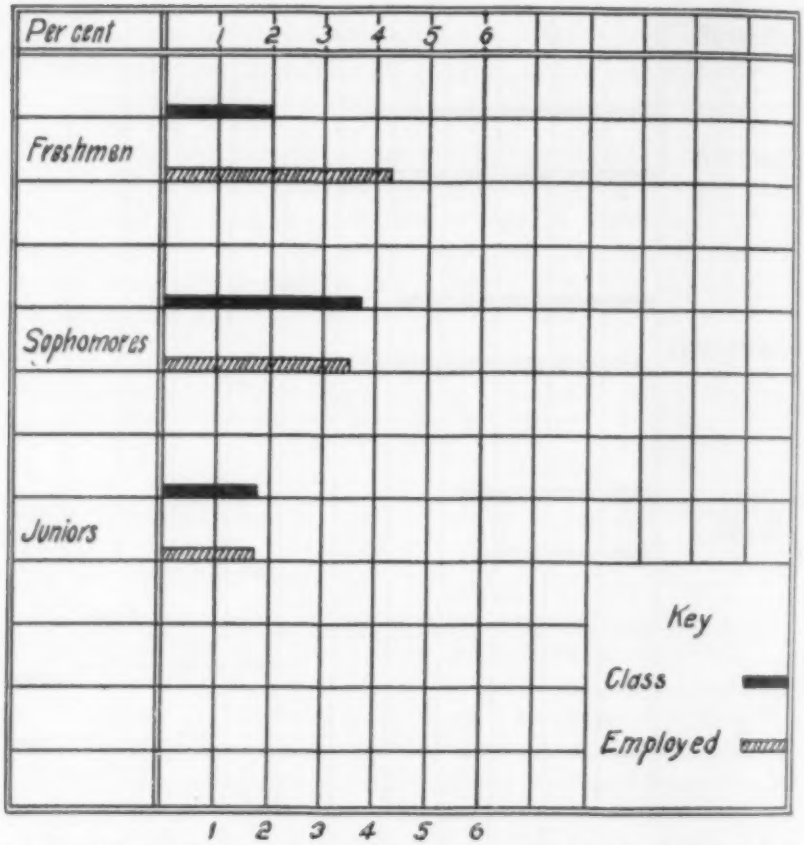


FIGURE 2. SUBJECT FAILURES OF GIRLS ACCORDING TO CLASS AND EMPLOYED GROUPS

Among sophomore and junior girls who were employed, there was no significant difference in ability from the group averages as shown in Tables IV and VI. The percentages of failure were approximately the same as for the class averages.

# ATTENDANCE AND ACHIEVEMENT IN SECONDARY SCHOOL*

F. H. FINCH
*University of Illinois*
and
C. L. NEMZEK
*University of Detroit*

*Editor's note:* Intelligence in the opinion of many persons is only one of many factors conditioning pupil achievement. The authors present data on the relationship between attendance and school achievement with inconclusive results.

STUDIES of the relation between amount or regularity of attendance and school achievement have yielded mainly negative results. None of these studies has been such as would conclusively demonstrate the absence of any relationship between the factors in question. First of all, there has been only slight variability in attendance within most of the groups studied. While it may not be possible to measure achievement differences between groups when their attendance differs by 3 or 5 percent, it does not follow that marked differences in attendance will not be accompanied by measurable differences in achievement. In the second place, the studies that have dealt with this relationship have in some instances been limited to one or two semesters. When this factor is coupled with the one previously mentioned, the chance that any slight existing relationship would be observable is still further reduced. In the third place, no single study has dealt with data from a group of subjects homogeneous as to age, sex, home background and other factors which might in some manner be of influence upon the relation in question. Of greater consequence, probably, is the difficulty growing out of the limitations of instruments available for the measurement of achievement and intelligence. If intelligence tests are designed in a fashion such as will afford a basis of comparison only among individuals who have in general a common background of experience, can one logically control measured intelligence in order to examine the effect upon achievement produced by varying the experience of individuals? At any rate, the community of function between intelligence tests and general tests of school achievement is sufficient to offer a serious obstacle to any investigation of such a problem as the present which makes use of these two types of measures. Evidence that this is the case is

* This paper presents certain of the results of an analysis of the records of the Personnel Office of University of Minnesota High School made in cooperation with Prof. John E. Anderson of the University of Minnesota Institute of Child Welfare.

found in Gordon's (10) study of retarded children. Among 184 physically defective children who had attended school on the average 48 percent of the time since age five he observed a correlation of .313 between IQ and percent of attendance. The correlation between EQ and attendance for the same group was identical. Similar relationships were found among gypsy children who, on the average, had attended school only 35 percent of the time since age five. Data were also presented for a third group, made up of 76 children who lived on canal boats, and who therefore differed from other children both in their home environment and in their almost complete non-attendance at school. These children showed very slight gains in MA during the elementary school years; the rank correlation between CA and IQ was found to be $-.76 \pm .03$, and the average drop in IQ between ages 6 and 12 appeared to be about 5 points per year. In the light of these findings the author has concluded concerning the abilities measured by mental tests ". . . such abilities are not developed without schooling or its equivalent, and as a consequence the tests do not evaluate them apart from schooling, except *perhaps* in the case of children under six or seven years of age." Quite possibly absence from school in amount sufficient to be reflected in a general measure of achievement, as the EQ, will also show an influence on the IQ as determined by tests of the kind ordinarily used.

The authors of the earlier studies of the relation of attendance and achievement were not vexed by such problems as the above, since they made no effort to control intelligence, nor to obtain more than a very rough measure of achievement. Typical is the work of Ayres (2) who, in a paper entitled "Irregular Attendance—A Cause of Retardation", concludes that irregular attendance is accompanied by a low percentage of promotion, and that of Keyes (13), who reports frequent absence associated with retardation. In a more recent dissertation by Cooper (5), using the same general type of data, there are rather uncertain grounds for the conclusion that among 832 entrants, over 70 percent of the retardation at the end of the year was chargeable to irregular attendance. Feingold (8) likewise assumes a causal relationship after observing an association between regular attendance and superior marks in high school, even though he has controlled none of the additional factors which may play a part.

Among studies that have employed standardized tests of achievement, and have attempted to control intelligence, that by Odell (16) is typical in its findings. Several thousand elementary school children were given a bat-

tery of standard achievement tests at the beginning, and again at the end of a semester. Gains in achievement test scores and teachers' marks were each correlated with percentage of days attended during the period. The relationships observed lead the author to conclude that gain in achievement age is related to percentage of attendance only in those cases having extremely poor attendance, and that attendance shows a closer relationship to teachers' marks (r.— .14) than to objective measures of achievement. It was found that controlling the effect of intelligence (measured with a variety of tests, the results of which were apparently combined indiscriminately) by partial correlation made no significant change in the relationships. Furthermore, Odell found that attendance in successive semesters was correlated only to the extent of .19.

Reavis (17), studying data from five rural counties, found the correlation between attendance and teachers' ratings as to quality of school work to be about .35 for children below age 8, and .20 to .25 in older groups (p. 12). His report does not permit an evaluation of these coefficients in terms of the variability of attendance records in the different age groups represented.

Ross (18) reports slight negative correlations between attendance in elementary school and teachers' marks, but on such a limited number of cases that his figures are statistically insignificant.

Wetzel (19) compared the achievement of senior high-school students absent or tardy or both on ten or more days in a school year, and that of students whose attendance was perfect throughout a school year, with that of the entire student body. The records were classified according to ability, and comparisons were made at various levels. No mention is made of the measure of ability employed, nor is the index of achievement intelligibly described. The number of cases at each level is also unfortunately omitted. He reports that students never absent or tardy surpass the average of the total student body in achievement, while those absent or tardy ten or more times are at most ability levels shown to be below the general average in achievement.

Ziegler (21), correlating attendance and teachers' marks for 307 pupils in grade 7B, found a zero order coefficient of .34. By partialling out intelligence, overageness, desirability of home location, economic status of the family, and distance from school, a figure of .23 was obtained. This author reports for these cases the rather surprisingly high correlation of .71 between attendance during the four years prior to entrance to 7B and attendance in

7B, whereas school marks for the two periods showed a correlation of only .50. He has also studied the relation of attendance to marks in single school subjects for the same pupils. That he found positive correlations in each case seems to be of less significance than the fact that the observed relationship was .44 for history and only .05 for geography. While the reason for this wide spread can not be determined from his data, it may well be that the marks from the teachers involved in these two departments are not equally valid measures of achievement.

A section of the Twenty-seventh Yearbook of the National Society for the Study of Education is devoted to three studies of the influence of attendance upon school achievement. The report by Heilman (11) deals with an investigation among 828 children in the schools of Denver, all of whom were in their eleventh year. The actual range in age for these subjects was 9 months. The Stanford Revision of the Binet Scale and the Stanford Achievement Test were employed to measure intelligence and achievement, respectively. The author reports the correlation between educational age and school attendance from first enrollment as .447, that between mental age and attendance as .317, and that between educational age and mental age to be .737. Eschewing the technique of partial correlation, the author has applied instead Wright's formulae for the path coefficient and the coefficient of determination. From the latter he concludes that "less than 5 percent of the variation in E. A. (school achievement) is determined by S. A. (school attendance) . . ." (p. 61). Heilman also quotes an unpublished study by Woolf (20), carried out in much the same fashion as his own work, but based upon data from 157 children in the public elementary schools of Greeley, Colorado. The results, so far as attendance and achievement are concerned, parallel closely those recorded by Heilman.

A second study, by Denworth (7), is based upon data from 829 children ranging in age from 8 to 13 years. The children, at the time the study was initiated, were pupils in a single public elementary school. The total school attendance of all the children studied had been in public schools of New York City. Intelligence was measured with the Stanford Revision of the Binet Scale; achievement with the Stanford Achievement Test. Attendance was expressed in terms of total days spent by the pupil in school since his first enrollment. Between attendance and educational age, with chronological age constant, the correlation was found to be .29 $\pm$ .02. The author makes no attempt to examine the relationship between attendance and

achievement with intelligence constant, despite the fact that intelligence records were available. She does, however, give the following regression equation for estimating standard educational scores, as determined upon 700 of her subjects who were between 9 and 12 years of age when tested;

$$Z_1 = .692\,Z_2 + .171\,Z_3 + .126\,Z_4$$

when $Z_2$, $Z_3$ and $Z_4$ are mental age, school attendance, and chronological age, respectively.

The third study is that of O'Brien (15), who examined records of 585 children in one-teacher elementary schools. He found that during two and one-half years 333 of these had attended 90 percent or more of the time, 149 had attended between 80 and 90 percent of the time, and 103 had been present less than 80 percent of the time. Without giving details of his comparisons, he states that the group with the highest attendance does not surpass either of the others in scores on achievement tests in spelling, reading, composition, writing, addition, and multiplication. He also states that retardation is much more common in the lowest attendance group, but that the correlation between mental test scores and attendance is only .05 for the entire sample.

Jensen (12), in a study of the relation of class size to achievement in high school algebra, considered regularity of attendance as a possible factor to be controlled. He found, however, a negligible correlation between attendance and achievement for the 80 cases on which he obtained data. Butler (4, 4a) has presented data which indicate that secondary school students who receive high marks are absent less frequently than students who receive low marks.

Finch and Nemzek (9) have reported a small but significant relationship between attendance and teachers' marks for high school girls. Data on boys from the same school did not, however, exhibit an equal relationship.[1] Two groups of girls, including 114 and 208 cases, revealed partial correlations of .32 and .39, respectively, between attendance and achievement with intelligence constant. Comparable figures for boys from the same classes were .13 ($N = 101$) and .24 ($N = 214$).

[1] Browne (3) reports evidence for sex-differences in causes of absence among students in the University of California High School. She also finds a sex-difference in the distribution of days absent. Ziegler (21), in his attendance study, recognized a difference in the attendance as well as the achievement records of boys and girls, but made no attempt to determine whether his results (previously quoted) were affected by this factor.

The following findings are based upon the records of 300 graduates of the University of Minnesota High School, of whom 141 were boys and 159 were girls. Absences have been expressed in average number of days per year the individual failed to attend school, and tardiness in average number of mornings per year on which the individual came late for the opening of school. Conditions affecting absence and tardiness may be considerably different from those prevailing in a typical secondary school, as these students came from homes widely scattered throughout Minneapolis and St. Paul. A large proportion of them came relatively long distances to school, and were dependent upon street cars or upon private means of transportation. Furthermore, there were probably few or no absences for economic reasons.

Intelligence quotients were obtained from scores on a battery of five group tests given to each student at or shortly before the date of his entrance to University High School. The tests employed were Army Alpha 8, Haggerty Delta 2, Pressey Senior Classification, Terman Group Test of Mental Ability, Form A, and Miller Mental Ability Test, Form A. The scores on each test were used to calculate intelligence quotients according to the instructions in the respective authors' manuals, and then, using the technique described by Miller (14), all other than those from Terman were converted into Terman equivalents. From the five quotients thus available for each child the middle value has been employed as a measure of intelligence.

The measure of achievement was derived by computing for each individual an honor point average based upon teachers' marks in all subjects taken in high school.

The zero order coefficients furnish evidence that among this group of boys regularity and promptness in school attendance are practically unrelated to achievement as measured by teachers' marks. Among the girls, on the other hand, there exists between these same factors a correlation of approximately .3. The partial coefficients show that the observed relationships hold when intelligence is controlled.

The sex-difference in these relationships resembles, in both magnitude and direction, that observed in a previously cited study based upon data from a public high school in Minneapolis (9). The evidence from these sources strongly favors the conclusion that regularity of attendance on the part of high-school girls is associated to a slight extent with the marks assigned to them by their teachers, while among high school boys there is nothing which indicates the existence of the same degree of association. There is of course

TABLE I

THE RELATION OF (1) ABSENCES AND OF (2) TARDINESS TO (3) ACHIEVEMENT AND TO (4) INTELLIGENCE

| | Males N = 141 | Females N = 159 |
|---|---|---|
| $M_1$ | 6.42 | 7.68 |
| $M_2$ | 2.76 | 2.58 |
| $M_3$ | 1.20 | 1.55 |
| $M_4$ | 117.10 | 117.30 |
| $SD_1$ | 5.07 | 5.37 |
| $SD_2$ | 2.38 | 2.16 |
| $SD_3$ | .595 | .650 |
| $SD_4$ | 11.60 | 10.50 |
| $r_{12}$ | $-.034 \pm .06$ | $-.309 \pm .05$ |
| $r_{13}$ | $-.017 \pm .06$ | $-.088 \pm .05$ |
| $r_{23}$ | $-.154 \pm .06$ | $-.306 \pm .05$ |
| $r_{24}$ | $-.138 \pm .06$ | $-.076 \pm .05$ |
| $r_{34}$ | $+.590 \pm .04$ | $+.585 \pm .04$ |
| $r_{12.4}$ | $-.030 \pm .06$ | $-.319 \pm .05$ |
| $r_{23.4}$ | $-.090 \pm .06$ | $-.323 \pm .05$ |

reason to question the validity of marks as a measure of actual school achievement, since irregularity of attendance may in some cases influence teachers to discriminate in their markings against students whose achievement is equal to that of their more punctual classmates. It hardly seems plausible, however, to suggest a sex-difference in such discrimination that could be responsible for the relationships that have been observed. No more easily supported is the conclusion that girls find their achievement dependent upon regular class attendance, but that within the limits of irregularity here involved, no such causal relationship exists among boys. Instead, it is possible that among girls there is some characteristic or combination of characteristics which determines in part both achievement and regularity of attendance, and that no such factor is operative among boys. The data at hand are obviously insufficient to place this possible explanation on other than a speculative basis. It appears, nevertheless, to merit more extensive investigation, since the discovery of such a factor might lead to at least a partial understanding of those qualities, not measurable with present day intelligence tests, which contribute to academic achievement.

BIBLIOGRAPHY

1. Ayer, Adelaide M. "A Study of Rural School Attendance," *Journal of Rural Education,* IV (1925), pp. 385–398.
2. Ayres, Leonard P. "Irregular Attendance—A Cause of Retardation," *Psych. Clinic,* III (1909), pp. 1–8.
3. Browne, Elsie. "The Study of Absenteeism in the University High School, Oakland, California, from the Period from August 24, 1925, to January 21, 1927," *American Physical Education Review,* XXXIII (1928), pp. 16–22.

4. Butler, Charles H. "School Achievement and Attendance," *School Review,* XXXIII (1925), pp. 450–452.
4a. Butler, Charles H. "Relation of Achievement and Attendance in One High School," *School Review,* XLIV (1936), pp. 288–290.
5. Cooper, Hermann. *Progress and Attendance of Rural School Children in Delaware,* T. C., Columbia Univ. Cont. to Educ., No. 422 (1930), pp. xii + 150.
6. Crider, Blake. "The Effect of Absence on Scholarship," *School and Society,* XXX (1929), pp. 27–28.
7. Denworth, Katherine M. "The Effect of Length of School Attendance upon Mental and Educational Ages," *The Twenty-Seventh Yearbook of the National Society for the Study of Education,* II (1928), pp. 67–91.
8. Feingold, Gustave A. "Scholarship, Attendance and Deportment," *School and Society,* XXVIII (1928), pp. 333–335.
9. Finch, F. H. and Nemzek, C. L. "Attendance and Achievement in the High School," *School and Society,* XLI (1935), pp. 207–208.
10. Gordon, Hugh. *Mental and Scholastic Tests Among Retarded Children,* London Board of Education Pamphlets, No. 44 (1923).
11. Heilman, J. D. "The Relative Effect upon Educational Achievement of Some Hereditary and Environmental Factors," *The Twenty-Seventh Yearbook of the National Society for the Study of Education,* II (1928), pp. 35–65.
12. Jensen, Milton B. "The Influence of Class Size upon Pupil Accomplishment in High School Algebra. II. Results of an Investigation in Second Semester High School Algebra," *Jour. Educ. Research,* XXI (1930), pp. 337–356.
13. Keyes, C. H. *Progress Through the Grades of City Schools.* T. C., Columbia Univ. Cont. to Educ., No. 42 (1911), p. 79.
14. Miller, W. S. "The Variation and Significance of Inteiligence Quotients Obtained from Group Tests," *Jour. of Educ. Psych.,* XV (1924), pp. 359–366.
15. O'Brien, F. P. "The Conditional Value of a Longer School Year in One-Teacher Schools," *The Twenty-Seventh Yearbook of the National Society for the Study of Education,* II (1928), pp. 93–95.
16. Odell, C. W. "The Effect of Attendance upon School Achievement," *Jour. of Educ. Research,* VIII (1923), pp. 422–432.
17. Reavis, George H. *Factors Controlling Attendance in Rural Schools,* T. C., Columbia Univ. Cont. to Educ. (1928), pp. vi + 63.
18. Ross, Clay C. *The Relation Between Grade School Record and High School Achievement,* T. C., Columbia Univ. Cont. to Educ., No. 166 (1925), pp. viii + 70.
19. Wetzel, H. A. "School Attendance and Scholarship," *School Review,* XXXVI (1928), pp. 118–120.
20. Woolf, Henriette K. *The Relative Influence of Some Environmental Factors and Mental Age on Educational Age,* Unpub. Master's Thesis, Colorado State Teachers' College, Greeley, Colorado (1926).
21. Ziegler, Carl W. *School Attendance as a Factor in School Progress.* T. C., Columbia Univ. Cont. to Educ., No. 297 (1928), pp. vi + 63.

# A STUDY OF THE HONESTY AND ACCURACY FOUND IN PUPIL CHECKING OF EXAMINATION PAPERS

ARTHUR G. HOFF
*La Crosse State Teachers College*
*La Crosse, Wisconsin*

*Editor's note:* Harthshorne and May reported some years ago a series of well known studies of honesty. The author presents herein new data from a slightly different point of view.

BECAUSE of large classes, increased teacher loads, and the necessity of constant checking of pupil progress, there is a definite need for the development of a system whereby certain clerical burdens involved in testing may be shifted from the teacher to the pupils. The two chief obstacles which confront the successful operation of such a technique are, first, the personal honesty of the pupils and, secondly, the inaccuracy of pupil grading. This study attempted to discover a method which will reduce these factors to a minimum.

## PROCEDURE

This study was conducted over a period of three years by the writer and senior students in the secondary education department of the La Crosse State Teachers College who were engaged in student teaching.[1] It was made in three parts and a certain phase of the study was completed each year.

A different group of pupils was employed in each of the three parts of the study. To equate groups a preliminary test, using plus and minus responses for true-false items and numbered responses for multiple choice items, was administered to each group to determine the amount of inaccuracy due to carelessness or dishonesty which could be credited to each group. In the study of errors, the responses as given in the original test, were employed in Part I; plus and zero responses were substituted for true-false items in Part II and the responses numbered and underlined; and in Part III where pupils exchanged with persons other than friends, the checkers crossed out blank items and signed their names in a designated place on the test sheet in addition to the other precautions indicated above. There were at least 60 pupils involved in each phase employing two to four classes in chemistry which were open to high-school juniors and seniors.

[1] Thomas Shinko, Val Sonsella, Karl Farwell, Ewald McCoy, Willard Turner, Robert Rollig, John Gerletti, Willard Hanson.

Following each test the papers were collected at the end of the period and then handed back to the pupils for checking the following day. In the meantime, the student teachers recorded each response to every item on each test sheet on squared graph paper. After the pupils had checked the papers the following day, the assistants again recorded the responses and checked the papers. This would reveal the actual number of changes and the number of errors due to carelessness.

## RESULTS

1. The percentage of error found when pupils checked their own papers using plus and minus responses for the true-false items ranged from approximately seven to eight percent. The percentages were 6.94, 8.10, and 7.58 for groups I, II, and III respectively. These figures show that each of the three groups had approximately the same tendency toward dishonesty and inaccuracy.

2. In group I which was composed of 153 chemistry pupils it was found that an average error of 4.49 percent occurred while they checked their neighbor's examination papers requiring plus and minus responses.

TABLE I

ERRORS IN CHECKING EXAMINATION PAPERS

| Part of* Study | No. of Pupils | No. of Items | No. of Errors | Percentage of Error Pupil | Teacher |
|---|---|---|---|---|---|
| 1 | 2 | 3 | 4 | 5 | 6 |
| I. Checking Own | 153 | 15,300 | 1062 | 6.94 | |
| Neighbor's | 151 | 15,100 | 678 | 4.49 | |
| II. Checking Own | 136 | 13,600 | 1102 | 8.10 | 1.75 |
| Neighbor's | 136 | 13,600 | 440 | 3.24 | 1.35 |
| III. Checking Own | 64 | 6,400 | 486 | 7.58 | |
| Exchanged | 60 | 6,000 | 37 | .61 | |

* In Part I of the study plus and minus responses were employed for the 80 true-false items. In Part II plus and minus responses were employed where pupils checked own papers, and plus and zero when checking their neighbor's papers. In Part III plus and minus were used in checking own paper and plus and zero when pupils exchanged according to specific directions. The checker signed his name on a specified place on the paper, and blanks were crossed out.

3. When plus and zero responses were required the percentage of error was reduced to 3.24 while 136 pupils in group II checked their neighbor's paper.

4. In group three the percentage of error was reduced to .61. This is slightly over one percent less than the teacher errors of 1.75 and 1.35 percent found to occur in checking two groups of 136 papers each. Approxi-

mately half of the errors were due to cheating, that is, deliberate changes in responses by the checkers.

5. There were two significant observations resulting from this which may be worthy of mention.

(1) Pupils tend to do less cheating and be more accurate in checking their neighbor's papers than while checking their own papers.

(2) Bright pupils tend to cheat, as well as pupils of less ability, although not to as great an extent. The correlation between honesty and I.Q. for 75 pupils was found to be .324; and between grades in chemistry and honesty it was .311.

## CONCLUSIONS

1. Pupil checking of objective type examination papers can be done as accurately or more accurately than teacher checking if the work is controlled. Plus and zero responses must be employed with true-false items; multiple choice items must be underlined; pupils must be required to exchange papers with other than friends; blank items must be crossed out before checking begins; and the name of the checker must be placed on the paper so as to make the pupil personally accountable for the checking.

2. Pupils checking their own papers results in scores which are too unreliable for just grading of pupils.

3. Controlled pupil checking of papers may have many desirable advantages. It makes possible more efficient teaching because:

(1) Pupils can secure a prompt evaluation of their work; (2) remedial work can be done at the most effective psychological moment; (3) the teacher is able to spend his energy and time preparing more effective lessons; (4) the teacher's vital energies can be conserved, and (5) learning can be made more satisfying to the pupils.

Furthermore, the pupils are given an opportunity to have a part in the evaluation of their work.

# THE GEOGRAPHIC ORIGIN OF PROFESSIONAL BASEBALL PLAYERS

HARVEY C. LEHMAN
*Ohio University*
*Athens, Ohio*

*Editor's note:* Much has been said in recent years pertaining to the relative contributions of heredity and environment to human intelligence and behavior. The author's data bear upon this important issue.

IN THE *Thirty-eighth Yearbook of the National Society for the Study of Education,* A. T. Jersild[1] summarizes several experimental studies that have been made of the effects of special exercises and training (environmental factors) upon motor performances. For most of the simple motor performances that have been studied, the evidence seems to indicate that these behaviors are little or entirely unaffected by special practice or training. It has been asserted by some writers that these simple behaviors depend so largely upon structural conditions, such as sensory, muscular, or neural development, that their performance is almost completely uninfluenced by specific exercise. These activities have therefore sometimes been described as "structurally fixed activities." Although this latter description is perhaps not wholly accurate, it will doubtless be conceded by most readers that some behaviors are probably more dependent upon structure than are others.

A limitation to most of the experiments cited by Jersild is the fact that the behaviors which were investigated were extremely simple ones, and the periods of stimulation were of relatively short duration (at most, six months). With reference to these experiments, Jersild[2] comments as follows:

"What would happen if longer periods of training, with varying techniques, covering a wider range of performance, had been employed, the data do not tell. Moreover, further information is needed as to the possible effect of abnormal deprivation of opportunity for spontaneous exercise. . . . It is possible, in the general field of motor development, that deprivation of opportunity to exercise potential abilities may have a more pronounced effect on the negative side than special training or opportunity will exert on the positive side."

[1] A. T. Jersild, "Education in Motor Activities," *Thirty-eighth Yearbook of the National Society for the Study of Education,* Part I (Bloomington, Illinois: Public School Publishing Company, 1939), pp. x–442.

[2] Ibid., pp. 60–61.

For obvious reasons major difficulties will need to be surmounted before thorough-going experimental studies of the effect of deprivation of opportunity to exercise will be reported. In so far as the present writer is aware, no extensive experimental study of the effect upon human adults of deprivation of opportunity to exercise their potential abilities has been reported.[3] Because of the almost insuperable obstacles which preclude this type of experimentation, the present paper can report no such experiment. On the contrary, this paper by a statistical analysis attempts to disclose, in part, the influence of certain environmental factors (among them, perhaps, deprivation of the opportunity to exercise potential abilities) upon the development in human adults of a very complex physical skill, namely, baseball skill.

## METHOD

From 24 annual editions of *Who's Who in Baseball*,[4] the present writer obtained the places of birth for 1,052 professional baseball players. In the foreword of *Who's Who in Baseball*, the publishers make the following explanatory statement:

"This book, as its name implies, is devoted to the better known or more talented players of the two major leagues. *Who's Who* does not claim to present the records of all the major league players nor even of all the regulars. Such an attempt would be impossible, if for no other reason, because of the continually changing personnel of the big clubs."

If the editors of *Who's Who in Baseball* have succeeded in their attempt to list the more talented players of the two major leagues, tabulation of the places of birth of the players whose names are included in the annual editions of *Who's Who* should reveal whether or not extraordinary baseball talent tends to be recruited more from some geographical regions than from others.

In compiling each new edition of *Who's Who in Baseball*, the editors usually delete the names of about 35 players; these are the names of players

[3] W. Dennis, "The Effect of Restricted Practice Upon the Reaching, Sitting, and Standing of Two Infants," *Journal of Genetic Psychology*, XLVII (1935), pp. 17–32. Dennis reports a pioneer study of infants in which a moderate amount of deprivation of opportunity to exercise was the major experimental factor.

[4] *Who's Who in Baseball*, published annually by the Baseball Magazine Company, 70 Fifth Avenue, New York City. Data were obtained from the 1912 edition, the editions of 1916 to 1921 inclusive, and the editions of 1923 to 1939 inclusive.

who have been released by the major league clubs. And each year the names of approximately 35 new players are inserted. It seems obvious that, as a group, the individuals whose names are included in *Who's Who in Baseball* are the most skillful baseball players of the United States (and of the world). From what parts of the United States are these highly skillful players most likely to be recruited?

As was stated previously, study of 24 of the annual editions of *Who's Who in Baseball* revealed the places of birth for a total of 1,052 different individuals. Of this number 1,034 were born in the United States. The number that were born in each state of the union was next ascertained. As would have been anticipated, marked regional differences were found. Some states produced relatively large numbers of professional baseball players; a few states produced none at all. In general, the more densely populated states produced the greatest number of players, and the less populous states produced the smallest number of players. More important for our present purpose is the question:—"In proportion to their total white population, how much baseball talent was contributed by the various states of the union?"

As a means of answering the foregoing question, the white population of each state of the union for the years 1890, 1900, and 1910 was first ascertained. Data for negroes were excluded because negroes are not permitted to play in the two major leagues. And population data for the years 1890, 1900, and 1910 were utilized because most of the players whose places of birth were ascertained were born between the years 1885 and 1915.

The succeeding step may be illustrated best by indicating how the data for two of the states were treated. Of the 1,034 baseball players who were born in the United States, 82 were born in California. If it be assumed that California should have contributed in proportion to the average of her white population for the years 1890, 1900, and 1910, California might logically have been expected to contribute only 24 of the 1,034 players. Actually, California contributed more than 3 times as many professionals as might logically have been anticipated upon the basis of her white population. More specifically, California produced 3.42 of her expected quota.

If Minnesota had contributed professional baseball players in proportion to the average of her white population for the years 1890, 1900, and 1910, 26 of the 1,034 players would have been born in Minnesota. The records reveal, however, that Minnesota contributed only 4 of the 1,034

professionals. Minnesota thus produced only .16 as many baseball players as might logically have been anticipated upon the basis of her white population. Query: Why, in proportion to her population, did California contribute more than 20 times as many professional baseball players as did Minnesota?

Table I presents information regarding: (1) the number of professional baseball players that were contributed by the states which lie south of Kansas and Missouri, and (2) the number that were contributed by the most northerly tier of states. In examining Table I the fact should be borne in mind that this table presents the numbers of players that were contributed by each of the states *in proportion to the average of each state's total white population* for the years 1890, 1900, and 1910.

TABLE I

THE NUMBER OF PROFESSIONAL BASEBALL PLAYERS THAT WERE BORN IN SOUTHERN STATES (THOSE THAT LIE SOUTH OF KANSAS AND MISSOURI) AND THE NUMBER THAT WERE BORN IN THE MOST NORTHERLY TIER OF STATES

| Southern States | No. of players | Per cent of total | Average white population 1890, 1900, and 1910 | Per cent of total white pop. | Players contributed in proportion to white pop. |
|---|---|---|---|---|---|
| California | 82 | 7.93 | 1,575,280 | 2.32 | 3.42 |
| Arizona | 3 | .29 | 90,332 | .13 | 2.23 |
| New Mexico | 1 | .10 | 202,233 | .30 | .33 |
| Texas | 62 | 6.00 | 2,383,662 | 3.52 | 1.70 |
| Louisiana | 13 | 1.26 | 742,599 | 1.10 | 1.15 |
| Mississippi | 16 | 1.55 | 657,358 | .97 | 1.60 |
| Alabama | 24 | 2.32 | 1,054,553 | 1.57 | 1.48 |
| Georgia | 25 | 2.42 | 1,197,146 | 1.77 | 1.37 |
| Florida | 6 | .58 | 321,950 | .48 | 1.21 |
| South Carolina | 9 | .87 | 566,325 | .94 | 1.04 |
| North Carolina | 38 | 3.68 | 1,273,164 | 1.88 | 1.96 |
| Tennessee | 29 | 2.80 | 1,529,413 | 2.26 | 1.24 |
| Arkansas | 17 | 1.64 | 964,737 | 1.42 | 1.15 |
| Oklahoma | 17 | 1.64 | 761,445 | 1.12 | 1.46 |
| Totals | 342 | 33.08 | 13,320,197 | 19.78 | 1.67 |
| Northern States | | | | | |
| Washington | 5 | .48 | 648,700 | .96 | .50 |
| Idaho | 0 | -- | 185,229 | .27 | -- |
| Montana | 1 | .10 | 238,155 | .35 | .29 |
| North Dakota | 1 | .10 | 354,655 | .52 | .19 |
| Minnesota | 4 | .39 | 1,697,529 | 2.51 | .16 |
| Wisconsin | 17 | 1.64 | 2,019,747 | 2.98 | .55 |
| Michigan | 21 | 2.03 | 2,418,861 | 3.57 | .57 |
| Ohio | 75 | 7.25 | 4,099,922 | 6.05 | 1.20 |
| Pennsylvania | 98 | 9.48 | 4,585,819 | 6.77 | 1.40 |
| New York | 69 | 6.67 | 7,349,120 | 10.85 | .61 |
| Vermont | 3 | .29 | 342,829 | .51 | .57 |
| New Hampshire | 4 | .39 | 405,512 | .60 | .65 |
| Maine | 4 | .39 | 697,160 | 1.03 | .38 |
| Totals | 302 | 29.21 | 25,043,238 | 36.96 | .79 |

It will be seen at once from Table I that, with the exception of New Mexico, each of the southern states contributed more than its expected quota of professional baseball players, and that each of the northern states, except Pennsylvania and Ohio, contributed less than its expected quota. Pennsylvania contributed 1.40 of its expected quota, and Ohio contributed 1.20 of its quota. Although the 14 southern states that are listed in Table I possessed only 19.78 per cent of the white population of the continental United States during the years 1890, 1900, and 1910, collectively, these states contributed 33.08 of the 1,034 major league baseball players. This was 67 per cent *more* than mere population data would have led one to anticipate. The 13 northern states that are listed in Table I, with 36.96 per cent of the white population of the United States within their borders, supplied, on the other hand, only 29.21 per cent of the major league players. This was 21 per cent *less* than their populations would have led one to anticipate. Had the 13 northern

TABLE II

THE 12 STATES OF THE UNION WHICH CONTRIBUTED THE LARGEST NUMBER OF PROFESSIONAL BASEBALL PLAYERS IN PROPORTION TO THEIR WHITE POPULATIONS, AND THE 12 STATES WHICH CONTRIBUTED THE SMALLEST NUMBER OF PROFESSIONAL BASEBALL PLAYERS

| Names of States which contributed most players | No. of players | Per cent of total e.g. of 1,034 | Average white population 1890, 1900, and 1910 | Per cent of total white pop. | Players contributed in proportion to white pop. |
|---|---|---|---|---|---|
| California | 82 | 7.93 | 1,575,280 | 2.32 | 3.42 |
| Arizona | 3 | .29 | 90,332 | .13 | 2.23 |
| North Carolina | 38 | 3.68 | 1,273,164 | 1.88 | 1.96 |
| Texas | 62 | 6.00 | 2,383,662 | 3.52 | 1.70 |
| Mississippi | 16 | 1.55 | 657,358 | .97 | 1.60 |
| Maryland | 22 | 2.13 | 947,181 | 1.40 | 1.52 |
| Alabama | 24 | 2.32 | 1,054,553 | 1.57 | 1.48 |
| Oklahoma | 17 | 1.64 | 761,445 | 1.12 | 1.46 |
| Pennsylvania | 98 | 9.48 | 4,585,819 | 6.77 | 1.40 |
| Georgia | 25 | 2.42 | 1 197,146 | 1.77 | 1.37 |
| Missouri | 58 | 5.61 | 2,868,957 | 4.23 | 1.33 |
| Oregon | 9 | .87 | 450,466 | .66 | 1.32 |
| Totals | 454 | 43.9 | 17,845,363 | 26.34 | 1.67 |
| Names of states contributing fewest players | | | | | |
| Idaho | 0 | -- | 185,229 | .27 | -- |
| Nevada | 0 | -- | 49,327 | .07 | -- |
| Wyoming | 0 | -- | 96,122 | .14 | -- |
| Minnesota | 4 | .39 | 1,697,529 | 2.51 | .16 |
| South Dakota | 1 | .10 | 424,157 | .63 | .16 |
| North Dakota | 1 | .10 | 354,655 | .52 | .19 |
| Montana | 1 | .10 | 238,155 | .35 | .29 |
| New Mexico | 1 | .10 | 202,233 | .30 | .33 |
| Maine | 4 | .39 | 697,160 | 1.03 | .38 |
| Connecticut | 6 | .58 | 908,250 | 1.34 | .43 |
| Utah | 2 | .19 | 281,605 | .42 | .45 |
| West Virginia | 7 | .68 | 934,040 | 1.38 | .49 |
| Totals | 27 | 2.61 | 6,068,462 | 8.96 | .29 |

states contributed at the same rate as the 14 southern states, the 13 northern states would have produced 638 of the major league players instead of only 302.

Table II presents: (1) the 12 states of the union which contributed the largest number of professional players in proportion to their white populations, and (2) the 12 states which contributed the smallest number in proportion to their white populations. It will be noted from Table II that, of the states which contributed most in proportion to their populations, only four of them lie north of Oklahoma. These four are Oregon, Maryland, Missouri, and Pennsylvania. Of the states which contributed least in proportion to their populations, only one (New Mexico) lies as far south as Oklahoma.

It was found in general that the large cities contributed more major league players than their combined populations would have led one to anticipate. When data for the 52 largest cities of the United States were assembled separately, it was found that these 52 cities had supplied 19 per cent more professional baseball players than their expected quota. As a group, however, the southern cities tended to supply more than their expected quotas, whereas, with few exceptions, the northern cities tended to supply less than their expected quotas. Inspection of Table III will bear out the foregoing assertion.

In Table III each of the 17 cities that is listed in the upper half of this table supplied more than twice its expected quota of baseball players. For example, Oakland, California, contributed 6.174 of its expected quota, and San Francisco supplied 4.531 of its expected quota. In contrast to the cities which are listed in the upper half of Table III, those listed in the lower half of this table contributed much less than their expected quotas. Thus, Boston supplied only .124 of its expected quota, Jersey City contributed only .325 of its expected quota, and the first seven cities which appear in the lower half of Table III supplied no individuals at all who were listed in *Who's Who in Baseball.*

## CONCLUDING REMARKS

In his book, *The Biological Basis of Human Nature,*[5] H. S. Jennings presents the thesis that each trait of an organism depends for its development on *both* heredity and environment. Since every trait of the organism depends

[5] H. S. Jennings, *The Biological Basis of Human Nature* (New York: W. W. Norton and Company, Inc., 1930), pp. xviii–384.

on both heredity and environment, it is absurd to speak of native and of acquired traits if by "native" we mean due solely to heredity and if by "acquired" we mean due solely to environment. It is entirely legitimate, however, to speak of trait *differences* that are due either to hereditary factors or to environmental factors. For example, individual differences among organisms that are genetically alike must be due to environmental factors. Similarly, individual differences among organisms that have had identical environments must be due to genetic factors.

Although in his book Jennings illustrates the foregoing thesis by citing individual differences in plant color and individual differences in other rather simple characteristics, the generalization that Jennings[6] presents is a rather broad one. He says, for example:

[6] Ibid., p. 134.

TABLE III

THE 17 AMERICAN CITIES WHICH SUPPLIED MORE THAN TWICE THEIR EXPECTED QUOTAS OF PROFESSIONAL BASEBALL PLAYERS AND THE 17 CITIES WHICH SUPPLIED THE SMALLEST NUMBER OF PLAYERS IN PROPORTION TO THEIR WHITE POPULATIONS

| Largest contributors | No. of players | Per cent of total | Average white population 1890, 1900, and 1910 | Per cent of total white pop. | Players contributed in proportion to white pop. |
|---|---|---|---|---|---|
| Oakland, Cal. | 8 | .77 | 84,532 | .1247 | 6.174 |
| San Francisco, Cal. | 23 | 2.22 | 332,029 | .4900 | 4.531 |
| Los Angeles, Cal. | 9 | .87 | 150,198 | .2216 | 3.925 |
| Houston, Texas | 2 | .19 | 33,196 | .0502 | 3.785 |
| Nashville, Tenn. | 3 | .29 | 57,133 | .0843 | 3.440 |
| St. Louis, Mo. | 28 | 2.71 | 535,525 | .7903 | 3.429 |
| Birmingham, Ala. | 2 | .19 | 39,036 | .0576 | 3.299 |
| Kansas City, Mo. | 8 | .77 | 163,196 | .2408 | 3.197 |
| Atlanta, Ga. | 3 | .29 | 64,789 | .0956 | 3.033 |
| Dallas, Texas | 2 | .19 | 45,874 | .0677 | 2.806 |
| Indianapolis, Ind. | 6 | .58 | 153,754 | .2269 | 2.556 |
| San Antonio, Texas | 2 | .19 | 54,792 | .0808 | 2.351 |
| Dayton, Ohio | 3 | .29 | 84,228 | .1243 | 2.333 |
| Cincinnati, Ohio | 11 | 1.06 | 313,516 | .4626 | 2.291 |
| Pittsburgh, Pa. | 13 | 1.26 | 389,880 | .5753 | 2.190 |
| Columbus, Ohio | 4 | .39 | 122,882 | .1813 | 2.151 |
| Springfield, Mass. | 2 | .19 | 63,905 | .0943 | 2.014 |
| Smallest contributors | | | | | |
| Akron, Ohio | 0 | -- | 45,918 | .0678 | --- |
| Fort Worth, Texas | 0 | -- | 34,056 | .0526 | --- |
| Hartford, Conn. | 0 | -- | 75,563 | .1115 | --- |
| Minneapolis, Minn. | 0 | -- | 221,056 | .3262 | --- |
| Newark, N. J. | 0 | -- | 251,469 | .3711 | --- |
| Providence, R. I. | 0 | -- | 172,408 | .2544 | --- |
| Youngstown, Ohio | 0 | -- | 51 213 | .0755 | --- |
| Boston, Mass. | 1 | .10 | 547,988 | .8085 | .124 |
| Jersey City, N. J. | 1 | .10 | 624,935 | .3074 | .325 |
| St. Paul, Minn. | 1 | .10 | 167,970 | .2478 | .404 |
| New York City | 21 | 2.03 | 3,176,229 | 4.687 | .433 |
| Omaha, Neb. | 1 | .10 | 135,054 | .1993 | .502 |
| Buffalo, N. Y. | 3 | .29 | 342,296 | .5051 | .574 |
| Seattle, Wash. | 1 | .10 | 115,541 | .1705 | .586 |
| Detroit, Mich. | 3 | .29 | 314,641 | .4643 | .624 |
| New Haven, Conn. | 1 | .10 | 104,592 | .1543 | .648 |
| Philadelphia, Pa. | 14 | 1.35 | 1,233,211 | 1.820 | .742 |

"From the nature of a distinctive characteristic, it is not possible to decide whether it is due to diversity of genes or to diversity of environment, since the same peculiarity may be due in different cases to either set of causes."

If, in the present study, it is fair to assume that there are no differences in the genetic constitutions of northerners and southerners which might account for the different extent to which these geographical regions contribute to the country's baseball talent, the conclusion seems inescapable that the *difference* in the extent to which the north and the south contribute to the country's baseball talent must be due to environmental factors.* It is unnecessary, and perhaps it is not possible, to state precisely which of the various environmental factors is most potent in effecting the resultant regional differences in baseball skill. It is sufficient to say that, if the foregoing regional difference is not due to chance factors or to diversity of genes, it must be due to diversity of environments.

A conclusion is not wholly trustworthy unless the assumptions which underlie that conclusion are valid. What, then, are the assumptions that have been made in the present study? It has *not* been assumed herein that the professional baseball player's developed talent is due either to heredity or to environment. We have accepted Jenning's assertion that each trait of an organism is due *both* to heredity and to environment. In the present study it is assumed only: (1) that the *difference* in the extent to which the northern and the southern states have contributed to the country's professional baseball talent is too large a difference and too consistent to be accounted for by chance factors, and (2) that the genes of southerners do not supply a set of conditions any more favorable for the development of baseball proficiency than do the genes of northerners. If the two latter assumptions be granted, the conclusion seems inescapable that the regional differences that have been set forth in this paper are due to environmental factors.

One can hardly refrain from speculating with reference to the possible causative factors. Among them perhaps are such factors as the following: (1) the longer playing season which is to be found in the south, (2) the

* These data seem to provide a concrete illustration of the validity of a statement made by Anastasi, namely:—"Hereditary factors may prevent the appearance of a function through the absence of the necessary structures, but the converse does not hold. The presence of such structures does not imply that the particular form of behavior in question will appear." See Anastasi, A. *Differential Psychology*, (New York: The Macmillan Co., 1937), p. 70.

presence in some states of a population sufficiently dense to make team play possible and tempting (this condition may have been lacking in some of the states which produced no professionals, i.e. Idaho, Nevada, and Wyoming), (3) the tradition and the custom of playing baseball (these factors may have been lacking among the Scandinavians of Minnesota and the Dakotas), and (4) available space for playing baseball (this may have been lacking, for example, in New York City).

It is not to be inferred that the southern parts of the United States provided ideal conditions for the development of professional baseball players. We know only that, the existant environmental differences resulted in the differential production of professional baseball players that has been set forth herein. If the environmental differences of the north and of the south had been greater than they were, it seems safe to assume that the regional differences in the production of professional baseball players would have been even greater than those actually found.

FIGURE 1

PROFESSIONAL BASEBALL PLAYERS CONTRIBUTED BY EACH STATE IN PROPORTION TO THE AVERAGE WHITE POPULATION OF EACH STATE FOR THE YEARS 1890, 1900, AND 1910.

# EDITORIAL

## CHOICE AND VALIDATION OF EDUCATIONAL TECHNIQUES

WHEN one teaches, supervises, or carries on administrative work one does so through the performance of specific acts considered appropriate to the task performed. All sorts of theories may be entertained about what might be done under various conditions, but when one comes to act one must act in some particular manner. These specific acts or patterns of acts are the techniques of education about which so much has been written and said. Their improvement constitutes the ultimate goal of much that we call professional education. The whole of professional education is concerned with acts, goals, and conditions. We are here concerned with acts.

Probably no aspect of education has been more generally misunderstood than this. One of the commonest and most disastrous misconceptions which seems to be implied in current attacks upon educational problems, and sometimes explicitly said, is that once the theory is understood the techniques will follow as a matter of course. This misconception is based up of a whole series of sub-misconceptions: a) that the common elements in situations upon which educational theory is based are all inclusive. Important as these elements common to a number of particular situations such as those for which practitioners are responsible, (and the generalizations drawn from them), they consume only small segments of each or the total situation. b) that the generalizations of which educational theory is composed imply specific and objectively defined acts. Seldom are generalizations so carefully drawn. There is usually great ambiguity as to their meaning such that they mean many things to many persons at different times and places and working under different conditions. c) that techniques are controlled by single considerations (generalizations). Ordinarily there is a conflict of values and some one must make a decision, frequently on short notice, and with very inadequate criteria. d) that the application of principles is easy and not very important. The correct application of principles is not easy and requires a high quality of mind notwithstanding an occasional statement

to the contrary. Misconceptions such as these and others have done very great harm; at best they have led to a great gap between theory and practice, and in some instances to the distrust of practitioner by theorist and vice versa.

In general practitioners tend to resolve this conflict by saying that there is too much theory, that it is impractical and academic, and that it is not very important. At least from the practitioner's point of view there is no very well defined way to use theory in practice. In the absence of well defined ways of bringing theory to bear upon practice, practitioners set up competing theories based upon personal experience. Sometimes they seem to say that there is no rule and one must depend upon judgments made upon the spot. All in all there is a lot of lost motion and this raises what seems to the writer an important question: How may one committed to the scientific study of education come to decisions about the techniques of teaching, supervision, and administration, and employ the aids supplied by science? I suppose there are, without doubt, first of all choices of technique to be made in concrete learning-teaching situations. If so how may one bring the validated generalizations of science to bear upon these choices? From one point of view the choice of techniques depends upon the characteristics of the situation: the goals sought, the persons involved, the conditions under which the work is done, etc. These considerations relate to the unique aspects of the situation not covered by rules, principles and generalizations; the generalizations of science relate to the elements common to a number of situations. How may one employ essential facts about the situations and verified generalizations in the control of action? The answer is not easy. To begin with it would seem that one must recall to mind some considerable number of generalizations, presumably all those that are pertinent to the situation at hand; then one must recall the sorts of acts implied by each (positively and negatively); probably one might then recall possible acts (alternatives) applicable to the situation at hand; each act must be tested against each principle for agreement and non-agreement; and each principle must be weighed for pertinence to the situation at hand and for importance; finally one must consider the unique aspect of the situation at hand. Thus one might come to some judgment about what to do. At best the judgment is a very subjective one; the hope is that it may have objective features. The ultimate test of the correctness of the judgment will be found in

whether it works, broadly conceived; at best the validated generalizations of a science of education are possibly merely temporary props or aids in the formation of judgments.

The purpose of this editorial is to call attention to a problem in the field of professional education. The problem here stated has implications not merely for those concerned with bridging the gap between theory and practice but for those engaged in research of all sorts. Certainly the goals, acts, and conditions for which different generalizations are true need to be made more explicit. Possibly too the time, money, and energy necessary for a given result need to be considered too as well as the merits measured by results. Possibly more consideration needs to be given to the appropriateness aspects of techniques as well as to their relative merits. In the realm of generalization we need to know more about their relative importance and pertinence. Some times to apply one principle one seems forced to neglect another. These and other problems seem to be important in any serious attempt to apply the findings of science to practice.

A. S. Barr.

# REVIEWS

**Address all communications relative to book reviews to Editor Kai Jensen, University of Wisconsin, Madison, Wisconsin.**

HAYNES, BENJAMIN R., and HUMPHREY, CLYDE W. *Research Applied to Business Education* (New York: Gregg Publishing Co., 1939), pp. vi + 218. $2.00.

WHELPTON, P. K. *Needed Population Research* (Lancaster, Penn.: Science Press Printing Co., 1938), pp. xvi + 196. $1.00.

JUDD, CHARLES H., and Others. *A Century of Social Thought* (Durham, North Carolina: Duke University Press, 1939), pp. viii + 172. $2.00.

LOWRY, FERN, Editor. *Readings in Social Case Work, 1920–1938* (New York: Columbia University Press, 1939), Pp. xiv + 810. $3.50.

*Research Applied to Business Education* might more appropriately have been called "Research Abstracts and Problems in Business Education" in view of the contents of the book, which devotes approximately 90 pages to investigational problems, fields, and abstracts. The treatment of research techniques is especially sketchy, with approximately the following distribution of pages: historical, 3; survey and activity analysis, 7; case study, 1; experimental, 3; interview, 1; and questionnaire, 3, consisting mostly of quoted materials, and in addition a sample questionnaire. One has only to examine the table of contents of a comprehensive treatment of research methodology to realize the brevity of such discussions and the omissions in the present list of investigational procedures. Other topics included are: statistical techniques, collection and classification of data, and reporting research. The reviewer wonders why it has seemed desirable to publish another book under a title so similar to that of the Haynes and Graham volume, *Research in Business Education*, 1932, except for the recency of the literature reported in the later volume.

*Needed Population Research* deals with the results of completed studies in this area, the methodology employed, and needed investigations. It covers the topics of: population forecasts and estimates (including school data), official population statistics, fertility and fecundity, mortality, migration, and optimum size and composition of the population. The study of population trends holds marked significance for educational workers in dealing with school enrollment trends, teacher supply and demand, teacher training, budgets, building programs, and adult education. The author places three major problems at the head of the list (pp. 195–6):

1. The motives leading couples to want a given number of children and practice birth control accordingly, considering not only the economic and biological matters affecting them personally but also the more general social matters affecting the attitude of the group.

2. The comparison of the present distribution of population within the nation with the optimum distribution, giving particular consideration to submarginal areas, areas of extremely dense population, and areas most capable of supporting more people.

3. The changes which are taking place in the hereditary makeup of the population, including their direction, rate and causes.

It has become a frequent occurrence to publish historical resumes of the accomplishments of the past century in a variety of fields, as witnessed by a number of the references under the first heading of the research bibliography which appears annually in the September number of the *Journal of Educational Research*. *A Century of Social Thought* includes a series of lectures delivered as a part of the centennial celebration of Duke University, during the academic year, 1938–39. The lecture of most interest to students of education is that by Charles H. Judd on "An Evolving Conception of General Education". Other fields and authors are: economics, Harold G. Moulton; religion, Henry S. Coffin; science and belief, John C. Merriam; socio-cultural trends, Pitirim A. Sorokin; planning in relation to the physical growth of cities and states, Robert Moses; and law, Roscoe Pound.

The current emphasis in education on diagnosis, guidance, and adjustment of program and procedure to the needs, interests, and abilities of the individual child owes much to the case method and to the resulting case studies in psychology, sociology, social work, and medicine, to name only a few of the fields where such evidence is available. Quite properly, case work in any field is concerned with the status of the phenomenon under investigation, the circumstances associated with the given phenomenon, diagnosis or identification of casual factors, application of remedial or adjustment procedures, and follow-up to determine the effect of the corrective measures applied. *Readings in Social Case Work* brings together a collection of authoritative statements on: basic philosophy (general concepts underlying social work practice, and philosophical concepts in case work practice), generic concepts in case work practice (early interviews and exploratory processes, continuance of study and diagnostic processes, and treatment processes), relation of practice to agency function and setting (concepts underlying case work practice in the specialized fields), functional interrelationships of case work and other social work fields, relation of social work practice to its professional and social setting, and relation of case work practice to community and socio-economic and cultural setting.

CARTER V. GOOD.
*University of Cincinnati*

MONROE, PAUL (Ed.). *Conference on Examinations (under the auspices of the Carnegie Corporation, the Carnegie Foundation, and the International Institute of Teachers College, Columbia University, at the Hotel Royal, Dinard, France, September 16th to 19th, 1938)* (New York: Bureau of Publications, Teachers College, Columbia University, 1939), pp. xiii + 330. $3.15.

The International Conference on Examinations was held five sessions: one each at Eastbourne, England in 1931, at London in 1933, at Folkestone in 1935, at Oxford in 1937, and at Dinard, France in 1938. The meetings in London and Oxford were administrative conferences

of the directors of the various national committees. The other three were plenary conferences, the discussion proceedings of which have been published in full and circulated by the International Institute. This volume is a detailed report of the 1938 meetings at Dinard.

It contains a list of the publications of the committees working in the different countries; brief reports of the current research work in the various cooperating countries; the opinions of the participants on examinations and educational procedures; and in many cases a brief description of the educational system of the country concerned. (We learn, for example, that Scotland has had a compulsory education law since 1497.) The countries represented were England, Scotland, France, the United States, Finland, Norway, and Sweden. At the close of the proceedings a committee was appointed to consider the possibility of a more permanent organization to continue this type of international cooperation.

A few of the principal points brought out by the representatives of some of the different countries will be mentioned to show the general tenor of the discussions.

Some of the results of the inquiry of the French Commission on the baccalaureat were reported by Monsieur Gastinel, a former Inspector-General of Public Instruction. A study was made of the consistency with which the examiners graded the papers in the baccalaureat. It was expected that a difference as great as two points in a total of twenty would be found in the case of candidates who were just about passable and an even greater agreement would be found for the extremely high or low papers. Much to the surprise of the Commission discrepancies of fifteen, twenty, and even of thirty marks out of a total of sixty were found. These surprisingly large discrepancies were explained in terms of the tendency of some examiners to grade low while others graded high; and as a result of this investigation it was decided to correct for differences in the average grade assigned by the different examiners. No mention was made of the necessity of correcting for differences in the dispersions of the grades assigned by the different examiners.

Mlle. Weinberg reported a factor study of the baccalaureat examination which revealed the existence of two factors, one a language factor and the other a quantitative factor which was represented primarily by the tests in mathematics and physics.

Monsieur Celestin Bouglé, director of the Ecole Normale Supérieure, reported on the procedure and objectives of the competitive entrance examination for this school. He felt that objective tests were unsatisfactory and unscientific; that "the essay is the best form of test, the test par excellence, because it permits one to evaluate general culture and mental alertness." Throughout the discussion which followed M. Bouglé stressed the importance of these two objectives of general culture and mental alertness and the necessity of testing for them by essay tests. This point of view was contested by the representatives from England and the United States, particularly Professor Thorndike.

Sir Philip Hartog reported on the results of some of the English studies of the consistency of marking among examiners, in which it was found in some cases that the correlation between examiners' marks was negative although a few months later the examiners themselves

would comment on the surprising agreement that existed between them.

Dr. H. R. Hamley, Professor of Education of the Institute of Education at the University of London, reported on the intercorrelations found between various tests, noting that "the highest correlation that we found anywhere was that between the spelling as judged from the examination scripts and the spelling test that was set. There the correlation was only .55."

Two of the Scottish representatives Professors Drever and McClelland reported on the results of some of the studies undertaken in Scotland: one on "The Intelligence of Scottish Children"; one on "The Prognostic Value of University Entrance Examinations in Scotland"; and another on the qualifying examination which is taken upon graduation from the primary school to determine the type of subsequent education which the pupil will receive. Elaborate follow-up studies were made over a period of several years in order to determine the correctness of the predictions made on the basis of the examinations. The results of this study were not yet available, but the examinations seemed to be quite adequate, correlations between similar examinations being as high as .92 or .93.

From the United States Dr. W. S. Learned reported on the results of the Pennsylvania Study, Dr. Ben D. Wood described the activities and program of the Co-operative Test Service, and Dr. Thorndike commented on examination procedures and results.

This book is primarily interesting for the picture it gives of the educational system and the state of development of test procedures in each of the countries represented; and also because the verbatim report of the discussions gives an impression of the different personalities involved.

HAROLD GULLIKSEN.
*University of Chicago*

MYERS, ALONZO F., and KIFER, LOUISE M. *Problems in Public School Supervision* (New York: Prentice–Hall, Inc., 1939), pp. xii + 211. $2.00.

The volume Principles of Teaching by Thorndike which appeared in print in 1906 is said to be one of the first texts to include problems for study. The late S. E. Parker, in 1915, predicted that texts would increasingly include true problems as distinguished from mere questions on the text. He further predicted that separate problem manuals would appear to accompany given texts or even so constructed as to be useful with any good text in the field. Parker himself published what was probably the first problem book to accompany a college text.

Parker's predictions about problems in the text and problem manuals have been amply justified on the lower levels. Elementary and secondary subjects and fields now contain many such teaching aids. This innovation, like all other departures, is much slower in penetrating the college level.

The volume here reviewed is a valuable addition to the small number of problem manuals available on the college level. It is superior to most of these books, first, in the amount of detail given with each problem, and second, in the sub-questions accompanying each problem.

The book is divided into eighteen units, each of which contains from two to four problems, forty in all. The units refer to typical major functions or processes of

supervision such as "Problems Relating to Teachers' Meetings and Conferences," "Supervision in Relation to the Organization for Supervision," "Induction and Guidance of Beginning Teachers," "Supervision in Relation to Superior Teachers," "Supervision in Relation to Weak and Inadequately Education Teachers." The specific problems under these unit headings may be illustrated as follows: "Initiating an Activity Program in a School That Does Not Want It," "How Should a Music Supervisor Make the Transition from Traditional Supervision to Consultant Type of Service?", "Aiding Teachers in Diagnosing Pupil Difficulties in Arithmetic by Means of Tests."

Each problem is described in concrete, specific terms at the length of from two to four pages. A list of analytic questions follows designed to direct the student in probing the situation. A bibliography concludes each problem. A feature of the list of problems is that it is not designed to accompany any one text; it may be used with any standard text or syllabus in the field of supervision.

The problems are all practical. The statements could be improved materially in a few cases but the list as a whole is well stated and stimulating. The major functions are nearly all covered. Problems are omitted upon such topics as The Evaluation of Educational Products, Studying and Evaluating the Curriculum, though there are a few that indirectly relate to that. Two others that are omitted are The Study and Evaluation of Supervision's Own Procedures, and the field of research and experimentation. However, the problems included should show most teachers how to construct others, not only on the units included but upon those omitted. This problem manual should prove of definite use to all who teach courses in supervision and also to many supervisors in service.

W. H. Burton.

*Harvard University*

# Research Abstracts and Bibliographies

Address all communications relative to research abstracts and bibliographies to A. S. Barr, University of Wisconsin, Madison, Wisconsin.

## BULLETINS

BATHURST, EFFIE G. *Conservation Excursions,* Bulletin 1939, No. 13 (Washington, D. C.: U. S. Office of Education, Federal Security Agency, 1940), pp. 106.

The author discusses conservation excursions: their purposes, uses, preparation, conduction, follow-up activities, and evaluation.

BATHURST, EFFIE G. *Curriculum Content in Conservation for Elementary Schools,* Bulletin 1939, No. 14 (Washington, D. C.: U. S. Office of Education, Federal Security Agency, 1940), pp. 79.

The author discusses conservation problems in the school program, significant aspects of conservation, the nature and scope of pupil activities relating to conservation, and the areas of conservation curriculum content.

BETTS, EMMETT ALBERT. *Visual Efficiency,* Data on Visual Sensation and Perception Tests, Part II (Meadville, Pa.: Keystone View Company, 1940), pp. 66.

The author presents data on the reliability and validity of the readings taken on three visual efficiency slides of the Betts Ready to Read Battery.

COOK, KATHERINE M., and REYNOLDS, FLORENCE E. *Opportunities for the Preparation of Teachers in Conservation Education,* Pamphlet No. 90 (Washington, D. C.: U. S. Office of Education, Federal Security Agency, 1940), pp. 13.

For those interested in the teaching of conservation, the authors list courses available and the institutions in which they are offered.

DOLL, EDGAR A. *Evidence Regarding the Nature of Intelligence from the Study of Inferior Deviates,* Reprinted from Addresses and Discussions of the Thirty-ninth Year Book of the National Society for the Study of Education, 1940 (Salem, Mass.: Newcomb and Gauss, 1940), pp. 9.

In this reprint of a paper read at St. Louis, the author discusses the nature of intelligence as revealed by the study of the mentally deficient.

GRIZZELL, E. D. *Educational Studies and Their Use,* American Council on Education Studies, Series I, Volume IV, No. 11 (Washington, D. C.: The American Council on Education, January, 1940), pp. 74.

The Committee on Implementation of Studies in Secondary Education reports on its study of the ways and means by which the results of educational research may be put into practice in our schools.

HOLMES, HENRY W., et al. *Educational Research: Its Nature, Essential Conditions, and Controlling Concepts,* American Council on Education Studies, Series I, Volume III, No. 10 (Washington, D. C.: The American Council on Education, November, 1939), pp. 189.

The Subcommittee on Educational Research presents a critical analysis of the logical foundations of educational research in the areas of: child development; the measurement of abilities, aptitudes, and achievement; reading; guidance and personality adjustment; and the structural aspects of educational finance.

LEARNED, WILLIAM S. *An Experiment in Responsible Learning: A Report to the Carnegie Foundation on Projects in Evaluation of Secondary School Progress, 1929–1938,* Bulletin No. 31 (New York: The Carnegie Foundation for the Advancement of Teaching, 1940), pp. 61.

The authors present a Carnegie Foundation report on an experiment conducted in four Pennsylvania schools in which the attempt was made to replace motivation by course "credit" and teacher's "mark" with an interest in the meaning of ideas and ability to use them intelligently.

MACKINTOSH, HELEN K. *Elementary Education: What Is It?* Bulletin 1940, No. 4, Part I (Washington, D. C.: U. S. Office of Education, Federal Security Agency, 1940), pp. 31.

This bulletin is the first of a series of four and contains a brief outline of elementary education, its nature, importance, and relation to the whole process of education.

MANN, ALBERT R., and HAVIGHURST, ROBERT J. *General Education Board: Annual Report 1939* (New York: General Education Board, 1940), pp. 171.

The General Education Board reports on its research and experimentation during the year 1939.

SEWELL, WILLIAM H. *The Construction and Standardization of a Scale for the Measurement of the Socio-Economic Status of Oklahoma Farm Families,* Technical Bulletin No. 9 (Stillwater, Oklahoma: Oklahoma Agricultural and Mechanical College Agricultural Experiment Station, April, 1940), pp. 88.

The author presents a scale for measuring the socio-economic status of Oklahoma farm families, describes its construction and standardization, and concludes that it is a valid and reliable testing instrument.

SPENCER, PETER L., ET AL. *The Language Arts,* The Review of Educational Research, X, No. 2 (Washington, D. C.: American Educational Research Association, April, 1940), pp. 175.

In this issue of the *Review,* the authors review the literature on the language arts for the three years ending October, 1939.

STRICKLAND, RUTH G., AND ENGELHARDT, N. L. *Twenty-seventh Annual Conference on Educational Measurements,* Bulletin of the School of Education, Indiana University, XVI, No. 4 (Bloomington, Indiana: Bureau of Cooperative Research, Indiana University, July, 1940), pp. 37.

This bulletin contains four papers read at the Conference on Educational Measurements held at Indiana University, April 8, 1940.

WHIPPLE, GUY MONTROSE, Editor. *Addresses and Discussions: Presenting the Thirty-ninth Yearbook, "Intelligence: Its Nature and Nurture" of the National Society for the Study of Education* (Salem, Mass.: Newcomb and Gauss, 1940), pp. 84.

This bulletin contains addresses given at the joint meeting of the National Society for the Study of Education, The American Educational Research Association, and the National Society of College Teachers of Education held at St. Louis, February 24 and 26, 1940.

WRAY, RUTH ARLINE. *The History of Secondary Education in Cumberland and Sagadahoc Counties in Maine,* The Maine Bulletin, XLIII, No. 1 (Orono, Maine: University Press, 1940), pp. 153.

The author presents a history of two Maine counties from 1603 to the present.

YOUNG, OWEN D., ET AL. *Youth, Defense, and the National Welfare* (Washington, D. C.: American Youth Commission, American Council on Education, 1940), pp. 9.

This bulletin contains the recommendations of the American Youth Commission presented by Chairman Owen D. Young to the Committee on Military Affairs of the House of Representatives, July 26, 1940.

### CURRICULA AND OBJECTIVES

BARNETT, I. A. "Reasoning Problems in Mathematics," *School Science and Mathematics,* XL, No. 6 (June, 1940), pp. 548–556.

The author suggests a type of problem intended to appeal to children of the elementary and secondary school age.

BRUMBAUGH, FLORENCE. "The Place of Humor in the Curriculum," *Journal of Experimental Education,* VIII, No. 4 (June, 1940), pp. 403–409.

From a study conducted with children of ages seven to thirteen, the author concludes that such children have humor tastes that are different from those of adults and need teachers who have a sympathetic interest in their type of humor.

HARRIMAN, HENRY I. "A Businessman Looks at Education," *The Educational Record,* XXI, No. 3 (July, 1940), pp. 395–405.

A businessman discusses the objectives of education.

### PSYCHOLOGY OF LEARNING AND TEACHING

BANKS, ANNA K. "An Evaluation of Students' Attitudes Developed Through Homemaking Instruction in the Secondary Schools of Oklahoma," *Journal of Experimental Education,* VIII, No. 4 (June, 1940), pp. 368–376.

The author presents data from a study of student attitudes and home economics instruction from which she concludes that there is a need for more effective instruction in the development of desirable attitudes in home economics classes.

BUEGEL, HERMANN F. "The Effects of Introducing Ideational Elements in Perceptual-Motor Learning," *Journal of Experimental Psychology,* XXVII, No. 2 (August, 1940), pp. 111–124.

The author presents data from an experimental study from which he concludes that ideational contexts give an advantage in the initial stages of learning a patterned motor performance.

DAHLE, CASPER O. "The Verbal Thought and Overt Behavior of Children During Their Learning of Long Division," *Journal of Experimental Education*, IX, No. 1 (September, 1940), pp. 1–8.

The author presents data from which he concludes that verbal records reveal errors not apparent in written responses during the learning of long division.

DAVIS, ROBERT A. "The Teaching Problems of 1075 Public School Teachers," *Journal of Experimental Education*, IX, No. 1 (September, 1940), pp. 41–60.

From a questionnaire study of teaching problems, the author concludes that making children wish to learn is a major problem and that the effect of the newer education is to cheapen the general quality of the learning process.

EICHEL, CHARLES G. "Experiment to Determine the Most Effective Method of Teaching Current History," *Journal of Experimental Education*, IX, No. 1 (September, 1940), pp. 37–40.

The author presents data from an experimental study of current history teaching and concludes that a sound-film was a more effective teaching medium than was a current news periodical.

ORR, DOROTHY. "Does Remedial Reading Carry Over in Junior High School?" *Peabody Journal of Education*, XVIII, No. 1 (July, 1940), pp. 452–459.

From a "follow-up" study of fifty-three children, the author concludes that remedial reading instruction given in the elementary school increases the probability of success in high school.

## STATISTICS, MEASUREMENTS AND SCIENTIFIC TECHNIQUES

DRAKE, C. ELWOOD. "Trends in the Field of Evaluating Secondary Education," *Educational Administration and Supervision*, XXVI, No. 4 (April, 1940), pp. 241–256.

The author discusses the evaluation of outcomes in secondary education.

JACKSON, VIRGIL DAVIS. "The Measurement of Social Proficiency," *Journal of Experimental Education*, VIII, No. 4 (June, 1940), pp. 422–474.

The author presents the data from an experimental study in which a new test of social proficiency was constructed. He concludes that the test measures some aptitude not measured by other tests.

JOHNSON, A. P. "A Study of One Company's Criteria for Selecting College Graduates," *The Journal of Applied Psychology*, XXIV, No. 3 (June, 1940), pp. 253–264.

The author presents data from which he concludes that the selection of college graduates for employment by one company could be improved by using "Family Background" as the basis of selection.

SEDER, MARGARET. "The Vocational Interests of Professional Women," *The Journal of Applied Psychology*, XXIV, No. 3 (June, 1940), pp. 265–272.

From data on the interests of men and women engaged in the same occupations, the author concludes that differences between the sexes are usually less frequent and less important than similarities.

# Research News and Communications

**Address all research news and communications to Carter V. Good, Teachers College, University of Cincinnati, Cincinnati, Ohio.**

*Psychology of War.*—The second yearbook of the Society for the Psychological Study of Social Issues, tentatively entitled *The Psychology of War*, is expected to appear about November 1. It has been prepared for the Society by a committee composed of J. F. Brown, University of Kansas; Ralph Gundlach, University of Washington; R. K. White, Cornell University; and Ross Stagner, Dartmouth College, chairman, who provided the present news item.

Unlike the Society's first yearbook, *Industrial Conflict: A Psychological Interpretation*, which included a number of articles not closely integrated, *The Psychology of War* will form a continuous, integrated discussion. The authors have conducted a number of researches especially for the volume, but these are woven into the discussion of separate topics rather than taking the form of research articles. A very instructive study of the opinion of experts in various fields of social science regarding war prevention, for example, is used in different chapters as a starting point for the treatment of armaments, world organization, propaganda, education, and other important topics.

The new material presented, however, goes considerably beyond the mere public opinion poll. Special studies were conducted in which persons filling out questionnaires were subjected to intensive interviewing to find out what their answers really meant, i.e., what emotions and impulses were behind their expressed attitudes. In some cases, "free association" tests were conducted in an attempt to tap more or less unconscious attitudes. Statistical material and complex tables have been segregated in appendices, and pictorial statistics have been employed to facilitate comprehension by the reader who is not skilled in the jargon of psychological research.

In a general way, it can be said that the theoretical viewpoint rests on two major premises: that frustration leads to aggression; and that inhibited aggression may be displaced onto irrelevant individuals (members of a foreign nation). The psychoanalytic formulation of some problems is accepted, but the controversial "death instinct" is discarded.

Material from history, economics, and diplomatic relations is interpreted in the light of the psychological theory and research data. The authors, while asserting the basic character of psychology as an approach to social problems, make no claim to independence of these other disciplines.

Some questions are raised with regard to the course of American policy in the immediate future. With regard to long-range peace planning, the emphasis is laid on education and mental hygiene as

possible approaches to the modification of contemporary institutions which cause war.

*Social Studies Yearbooks.*—The Eleventh Yearbook of the National Council for the Social Studies is entitled *Economic Education.* It will appear about November 1, at which time it will be distributed free to all members of the National Council and also be made available to others at a cost of two dollars a copy for the paper edition and two dollars and thirty cents for the cloth edition. Formal presentation and discussion of the yearbook will take place at the annual meeting of the National Council for the Social Studies in Syracuse, November 21–23.

Economics as a school subject receives the major emphasis of the volume, although there is also consideration of the role of economics in "integrated" and "functional" curriculums, as well as of the economic content of other social studies. The first half of the volume deals with curriculum problems in economic education, while the second half considers methods and materials. In addition, there is a chapter by E. L. Thorndike on the question of, "Who Should Study Economics?"

An extensive survey of the current status of economic instruction on the elementary, secondary, and junior college levels contains the research findings of four collaborators. Other chapters give specific suggestions for using motion pictures, graphs, charts, pamphlets, and field trips in economic education. The concluding chapter contains an annotated list of printed materials for use in teaching economics.

Contributors to the yearbook are: Henry Harap, Ruth Gavian, Wilbur Gooch, Alpheus Marshall, Eugene Riley, John Cassels, Leon Marshall, Gordon McCloskey, Edward Thorndike, V. C. Arnspiger, G. H. Griffiths, Rudolf Modley, Edgar Bye, Archie Troelstrup, and Harold Clark, editor.

The Twelfth Yearbook of the National Council for the Social Studies, which will appear in November, 1941, is now being prepared. The subject treated is *Social Studies in the Elementary School.* The editor is William E. Young, head of the Division of Elementary Education, State Department of Education, Albany, New York.

Both yearbooks have been planned under the general supervision of the Publications Committee of the National Council: Mary Kelty, Burr W. Phillips, and James A. Michener, chairman. They may be secured from the office of the executive secretary, Wilbur F. Murra, 1201 Sixteenth Street, N. W., Washington, D. C.

The three-day convention on the teaching of the social studies in elementary and secondary schools, to be held at Syracuse, New York, November 21–23, under the auspices of the National Council for the Social Studies, begins with registration and entertainment on Thanksgiving Day. The Friday and Saturday sessions will include speeches and round-table discussions on a variety of topics such as: civil liberties, the teaching of economics, the place of geography, the defense program and the social studies, curriculum trends, and classroom methods. Among the speakers who will appear on the program are: Edmund Day, Dixon Ryan Fox, Theodore Blegen, Ernest Horn, Merle Curti, and Preston James. Anyone interested in social education is invited to attend. Room reserva-

tions and inquiries should be sent to Roy A. Price, chairman of local arrangements, Syracuse University.

*Yearbook on Art.*—The fortieth yearbook of the National Society for the Study of Education is entitled ***Art in American Life and Education.*** Copy is now going to press for this 1941 yearbook of the Society, the first in its history to deal directly and systematically with the visual arts. The volume will be issued in time for discussion at the February, 1941, meeting of the Society in Atlantic City. It has been in preparation during the past three years by a committee under the chairmanship of Thomas Munro, Curator of Education at the Cleveland Museum of Art, and Chairman of the Division of Art at Western Reserve University, who provided this progress report.

A detailed outline was prepared on the basis of a plan worked out by the late M. E. Haggerty of the University of Minnesota, who conceived and proposed the undertaking. There are four main sections, as follows: (1) Art in American Life, (2) The Nature of Art and Related Types of Experience, (3) Art Education: Its Aims, Procedures, and Agencies, and (4) The Preparation of Teachers of Art.

The yearbook is intended to be a survey of present ideas and practices in teaching the visual arts in this country at all age levels. It is intended also as a critical appraisal of the present situation, with recommendations for improvement. In these recommendations, the opinions of various contemporary schools of thought are represented.

The book is not a treatise on teaching methods in the narrow sense, or a manual for classroom and studio procedure. It deals rather with the more general and fundamental aspects of educational methods: the main objectives, materials, and types of activity involved. It is not restricted to formal, classroom schooling, but considers also the many outside influences, good or bad, which can be broadly grouped under the heading of "art," and which contribute to the shaping of personality.

The first part does not deal directly with education at all, but with the visual arts themselves as vital present activities in American society and as types of productive enterprise whereby people gain a living through providing goods and services. It considers visual arts partly from the consumer's standpoint, as a set of goods and services from which the user selects certain ones for purchase, enjoyment, and use. Thus the educational aspect is approached in a realistic way, in terms of art as an actual force in contemporary American life. It is hoped that Section I of the book will reveal in a forceful way the extent to which art is already a powerful factor in our social life and one to be taken seriously from the economic and social standpoint, as well as from the aesthetic point of view. Art is not conceived narrowly as drawing, painting, and sculpture alone, but as including architecture and city planning, industrial and commercial design, clothing, house furnishing, printing, and theatre arts.

Due attention is given to the many ways in which these visual arts enter the American educational system. There are chapters on the technical training of professional artists, and on the arts as part of a general, liberal education; on the training of teachers and supervisors of art; on the arts as taught at various

levels, from elementary school through college, graduate, and professional school; on the chief contemporary movements in art, and in the discussion of art values; on various contemporary theories of how art can best be taught, with recommendations for a judicious solution of these issues; and on art instruction from a school administrator's standpoint, with a consideration of costs, equipment, and organization.

*Adult Education.*—The 1940 yearbook of the International Institute of Teachers College, Columbia University, deals with adult education in some fourteen countries. This volume, under the editorship of I. L. Kandel, was in press at the end of August.

*Research Encyclopedia.*—The editor of the Encyclopedia of Educational Research began to receive galley proof about the first of August and, if no unexpected delays are encountered, the published work should be available early in 1941, probably by February. The Encyclopedia is under the editorship of Walter S. Monroe, with the sponsorship of the American Educational Research Association, and is being published by Macmillan Company.

*Dictionary of Education.*—Since the decision in December, 1937, that Phi Delta Kappa would sponsor the preparation and publication of a Dictionary of Education, the project has progressed through the following stages: (1) preparation of a handbook of procedure to serve as a guide for specialists or coordinators and cooperating organizations, (2) compilation of a master list of some 19,000 terms selected through an analysis of major publications and sources in the field of education, (3) selection of approximately one hundred coordinators to assume leadership in about one hundred and fifty subdivisions of education, and (4) choice by these specialists and their assistants of the terms to be defined in their particular areas. The project has now reached a point where definitions are being received in the Cincinnati editorial office, which makes possible the next step of reviewing such definitions and of editing them for consistency of style and form.

With the exception of the clerical and editorial assistance provided by Phi Delta Kappa for the central office located at the University of Cincinnati, in charge of Carter V. Good, the work of the Dictionary is being carried on by volunteer workers. The more than one hundred specialists in various areas of education who have accepted responsibility as coordinators for their fields have enlisted the aid of many associates and graduate students in the selection and definition of terms. This procedure probably will result in the cooperation of several thousand individuals. Some coordinators have formed committees numbering only a few collaborators, while other specialists are cooperating with as many as forty or fifty persons. In one case, during the summer of 1940, a graduate class of more than one hundred students was given an opportunity to assist in the selection and definition of terms in the curriculum area.

Coordinators have been requested to select words having educational or pedagogical significance, in contrast to terms having only teaching content or subject matter usage. For example, the field of mathematics may properly include for definition the "additive method of subtraction", but should exclude such

purely content terms as "triangle" or "circle". This procedure means that, in many instances, words appearing in the original master list of terms have been dropped, while in other cases words have been added. An editorial assistant is now engaged in checking the lists of words selected by the coordinators against the master list to discover any unnecessary overlapping of choices, as well as determine whether significant terms may have been overlooked.

At intervals of a few weeks progress reports are sent from the editorial office to the coordinators. These statements serve to acquaint the hundred or more specialists with the current status of the work on the Dictionary, and encourage an exchange of suggestions as to procedure. There is, of course, a considerable volume of correspondence between the Cincinnati office and the Dictionary workers.

In order to secure additional assistance in the review of definitions and to insure their general acceptability, the cooperation of some seventy national associations in education has been invited. Expressions of interest and of willingness to participate have been received from many of these organizations.

It is expected that by the end of 1941 the manuscript will be ready for the publisher, McGraw–Hill Book Company of New York City.

*Educational Policies Commission, 1940.*—The function of long-term planning in education is slowly becoming established within the profession. The acceptance and use of Educational Policies Commission publications are indications of this trend. Current effort of the Commission has been directed toward helping the profession to keep informed and toward leading the offensive against forces which would subordinate education to other interests less important in a democracy.

New Statements of Policy.—The Commission has given continuous recognition to the vital problems of education through its statements of policy.

*Education and the Defense of American Democracy* (July, 1940) suggests educational policies in support of national defense to meet the present world situation. The Commission believes that the American system of education must play a central role in defense of democracy. It recommends that schools should share in laying the physical and mental groundwork for effective military service, should take a large part in providing necessary vocational and technical training, should help to achieve national unity by clarifying national goals and by inculcating loyalties to the values basic in a democracy, and should aid adult citizens to reach sound conclusions on questions of national policy. This pronouncement follows the Commission's earlier statement on *American Education and the War in Europe* (October, 1939).

*For These Americas* (June, 1940) develops the ideal of inter-American cooperation and sets forth the place of education in building real friendship among the American states.

*Education and Economic Well-Being in American Democracy* (March, 1940) aims to clarify the economic contribution of education to our national life.

Occasional publication of informational materials has been continued. *On Our Way* is the published words, music, and stage settings of a musical revue based on *The Purposes of Education in Ameri-*

*can Democracy*. The annual summary of deliberative committee reports has been continued, as well as the bimonthly leaflet, *Educational Policy*.

Implementation Efforts.—In the past year the Commission has shifted its major emphasis from the preparation of publications to procedures of implementation. The consultants ex-officio continue to be an important instrumentality. The number of active consultants now exceeds 3200. In addition, there are nearly 4000 other persons to whom the Commission sends certain of its publications or information about each new statement

Cooperation with lay organizations has been expanded. The Commission lent the services of one of its staff members for four months to the White House Conference on Children in a Democracy, while the secretary served as a member of the Committees on Organization, Planning, Report, and Follow-Up. Other lay groups, such as the American Association of University Women, the General Federation of Women's Clubs, the National Congress of Parents and Teachers, the National Grange, organized business men, and organized labor, have been reached through printed materials and published articles.

Professional organizations, particularly the National Education Association and the American Association of School Administrators, have greatly assisted the Educational Policies Commission in its work. Notable cooperation has also been developed between the Commission and the American Association for Health, Physical Education, and Recreation and the Division of Affiliated Associations of the National Education Association.

Civic Education in the Schools.—An effort by the Commission to implement one major objective from *The Purposes of Education in American Democracy*, by studying the ways and means of improving Education for Civic Responsibility, was initiated in the summer of 1939. On this project, the staff members visited ninety secondary schools in twenty-seven states. The findings of the investigation have been brought together in a casebook of procedures in civic education which is scheduled for publication in September, 1940.

A small additional grant from the General Education Board in March, 1940, made it possible for the Commission to extend its study of civic education to include a group of CCC camps and NYA resident centers. A report on the civic education program in these agencies has been made to the American Youth Commission.

This progress report was prepared by the secretary of the Commission, W. G. Carr.

*Youth Commission, 1939–40.*—The strictly research activities of the American Youth Commission have of late been less extensive than in previous periods. The Commission's main energies are now devoted to reviewing the information it has assembled, securing agreement on major issues, and implementing its findings and conclusions. Several studies, however, have been undertaken or carried through to round out the program of fact-finding.

A major project with important research aspects which has recently been completed is the implementation program in CCC camps and NYA resident centers. The Commission's staff was given technical control for demonstration purposes of the educational and training activities in ten CCC camps selected to

afford a wide variety of conditions and enrollee types. An advisory relationship was also maintained with 22 resident centers of the NYA. In connection with both types of institution, procedures were devised and tested which it is believed will result in an improved program for the young people concerned. A report on this project, as well as an account of the findings of the Commission's previous study of the educational and social aspects of the CCC camps, will be published in a volume to appear during the course of the year. Its title is *Youth in American Work Camps,* by Kenneth Holland, who directed both projects. A supplementary volume analyzing case studies of CCC boys from both projects is being prepared by Ruth Cavan.

Another major activity involving a considerable element of experimentation was begun in the spring and is still in progress. This is the Commission's rural implementation project. It consists of identifying leaders of local rural communities who are anxious to organize work on behalf of their young people and of assisting these leaders with expert advice, and in some instances involves limited financial support. Seven counties in Michigan have been tentatively selected for various types of demonstration. Plans are also being made for activities in Iowa, Virginia, Georgia, and New York. The project is intended eventually to operate at all levels of rural organization—community, county, and state. It is to extend over a two-and-a-half year period. Howard Y. McClusky, of the University of Michigan, has joined the Commission's staff as an associate director and is in charge of this program.

Smaller research activities undertaken and completed during the past year include a study of citizenship training in CCC camps and NYA resident centers. This was conducted by the Educational Policies Commission at the request of the American Youth Commission. A survey of public opinion with regard to youth and education was conducted by the Commission in cooperation with the American Institute of Public Opinion, George Gallup's organization. The results are now being analyzed and are believed to be of great interest and importance.

The central staff of the Commission has been engaged upon various studies during the current year. An investigation of the problem of youth employment and unemployment has been going on under the direction of Paul T. David, associate director for research, who prepared the present progress report. The study has already produced an analysis from an economic point of view of the problems and policies of youth work programs, with special reference to the NYA. It is expected that this will eventually be published. *The Community and Its Young People,* by M. M. Chambers, is a recent staff publication designed to stimulate local leaders to organize action on behalf of youth. A staff volume analyzing the recreational problems of young people is in an advanced stage of preparation.

Other recent publications of the Commission include the first three of a series of reports on its extensive study of Negro youth. These are: *In a Minor Key,* by Ira De A. Reid; *Children of Bondage,* by Allison Davis and John Dollard; and *Negro Youth at the Crossways,* by E. Franklin Frazier. There will

be at least three other books in this series. Also on the Commission's publication program are *Education in Family Living*, by Joseph K. Folsom, and *Matching Youth and Jobs*, by Howard M. Bell. The latter volume is an outgrowth of the Commission's demonstration project to improve guidance and placement services to youth, conducted in cooperation with the United States Employment Service.

An important recent implementation activity was the appointment of a special committee of leading educators to consider necessary changes in the secondary-school curriculum. A unanimous report was adopted and has just been published as a volume entitled, *What the High Schools Ought to Teach*.

The chief accomplishment of the American Youth Commission during the past year is the adoption of a series of statements embodying the agreement of members on important aspects of youth problems. These have been published in separate pamphlets: *A Program of Action for American Youth; Community Responsibility for Youth; The Occupational Adjustment of Youth; Should Youth Organize? and Youth, Defense, and the National Welfare*. These statements represent an important step toward achieving the goal for which the Commission was created. The original documents and summaries have been widely distributed, and special efforts are being made to bring them to the attention of community leaders in a position to apply the principles formulated.

The Commission was originally financed by grants from the General Education Board for a period of five years ending June 30, 1940. In December, 1939, the General Education Board provided general support for the Commission for an additional year ending in June, 1941.

*Secondary Curriculum.*—The Commission on the Secondary School Curriculum of the Progressive Education Association has already issued the following reports: *Reorganizing Secondary Education, Science in General Education, Language in General Education, Mathematics in General Education, Art in General Education, Prose Fiction in General Education* and *Emotion and Conduct in Adolescence. Social Studies in General Education* is scheduled for September publication and *The Adolescent Personality: A Study of Individual Growth* for January, 1941.

*Institute of Child Welfare, University of California.*—During the year ending July 1, 1940, increased attention was given to the preparation of materials for use in connection with education, particularly with reference to the training of teachers.

Of some thirty articles and monographs published within this period, four have involved summaries of growth studies conducted in the Institute (the Adolescence Study, the Berkeley Growth Study, and the Guidance Study): Bayley, "Studies in the Development of Young Children;" Jones, "Principles and Methods of the Adolescent Growth Study" and "Procedures of the Adolescent Growth Study," and Macfarlane, "The Guidance Study." A monograph by Espenschade, "Motor Performance in Adolescence," deals with the development of motor functions, and contains results of particular interest to teachers of physical education. A monograph and

a supplementary publication by Tryon, "Evaluations of Adolescent Personality by Adolescents" and "Studies of Individual Children," discuss the social judgments and social relationships of junior high school pupils, examined through the medium of "reputation" tests. Current studies of mental development are represented in a series of six papers contributed by members of the staff to the Thirty-Ninth Yearbook of the National Society for the Study of Education; these reports deal for the most part with environmental influences upon mental growth careers in the nursery school period and at later ages.

In the belief that teachers in training should have access, not merely to group data about child development, but also to case materials, considerable effort has recently been devoted to preparing descriptive and interpretative records for individual pupils, covering a period of six or more years and dealing with various aspects of physical, physiological, emotional, social, and intellectual development. Mimeographed reports on several of these cases have been utilized in a number of education workshops during the summer of 1940, and also in the collaboration center of the Teacher Education Commission at the University of Chicago.

During the year, a six-year research program was completed, involving cooperative administration with the Oakland Public Schools.

The director of the Institute is Harold E. Jones, who provided the foregoing information.

*Classroom Instruction in Texas.*—The Survey of Classroom Instruction, a project sponsored by the Texas Association of School Administrators, a division of the Texas State Teachers Association, and directed by Hob Gray, University of Texas, was established in 1937 for the purpose of improving classroom instruction in the elementary and secondary schools of Texas.

During the period of 1937–39 an extensive checklist was distributed throughout the state to school superintendents, rural supervisors, and principals. After an analysis of responses had been made, results were published in the *Texas Outlook* with a view to fixing attention on the more important weaknesses in classroom teaching in Texas.

Throughout the school year of 1939–40 a new direction was given to the work of the Survey through the inauguration of a program of classroom experiments performed by classroom teachers. All classroom teachers who expressed an interest in this work were assisted in setting up and conducting their experiments. During the first semester the teachers received a set of bulletins designed to suggest and explain the procedures necessary for conducting various types of classroom experiments. These bulletins, prepared by D. F. Votaw, Southwest Texas State Teachers College, treated such topics as the selection and use of standardized tests, equating groups, keeping records, and reporting results.

An evaluation-form, in which the teacher was called upon to state whether values of a professional nature had resulted from conducting the experiment, was distributed near the close of the school year. A pupil-response form was also distributed to all children in the classes directly involved in the experiments of the participating teachers. Teachers stated that they received definite

values as a result of conducting an experiment. In addition, it was found that experimental-group pupils differ significantly from control-group pupils with regard to feelings of interest, enjoyment, and progress, the difference being favorable to the experimental group. Results of the 1939–40 program will appear in a research bulletin published by the University of Texas Press.

For the school year of 1940–41 the Survey will encourage continuation of classroom experiments, with particular emphasis on individualized instruction.

*New Zealand Research.*—The fifth annual report, 1939, of the New Zealand Council for Educational Research includes a brief review of the organization's first five years and comments on the program for the next five years. The work of the Council was made possible by an initial grant from the Carnegie Corporation of New York. During this time most of its energies have gone into a survey of the organization and administration of education in New Zealand, a task that, in accordance with its original program of research, has involved investigation along two distinct lines. In the first place, the Council has undertaken a series of studies (most of them taking the historical approach), designed to show how each of the more important parts of the educational system has come to assume its present scope and character, and to bring to light the nature of its relations both with other parts of the system, and with the general social and cultural background. Concurrently, a second, complementary set of researches has been undertaken. These are chiefly concerned with the various factors that determine the length and the direction of the path a child takes through the educational system, and thence to work, and their main purpose is to reveal in some detail how the educational arrangements actually work as instruments of guidance and selection. Such investigations usually take the form of "follow-up" studies in which attention is concentrated on the transition points in a child's life, from home to school, from class to class, from school to school, and from school to work.

The decision of the Carnegie Corporation to continue its grants for a second five-year term assures the Council of adequate financial support until at least the end of 1944. With its own researches to finish, and the responsibility of keeping in touch with a large group of part-time investigators, editing their reports and seeing them through the press, the permanent staff has plenty to occupy it for some time. The Council has, however, defined in general terms its policy for the second five years, and its plans will be further developed and put gradually into operation as work connected with the original program decreases. If these plans mature, the new research program will be mainly concerned with the practice of education—the problems of the curriculum, of teaching method, and of school government.

No. 2

nple-
nder-
with
the
ath a
tional
their
detail
actu-
e and
sually
tudies
ed on
life,
class,
school

rpora-
second
cil of
t least
earches
f keep-
of part-
reports
ess, the
cupy it
owever,
licy for
ns will
radually
ed with
If these
program
he prac-
of the
and of

JOU

Volum

DE

stat
vide
furt

An
city is u
tional,
come—
dex for
wise, m
as depa
study o
therefo

Th
of cens
of own
traits w
are the

* Pa
27, 1939
[1] Ei
pared ce
and list
Census,
Truesdel
article is
available
[2] Da
found in